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MASTER THESIS

What is the appropriate Monetray Policy regime for The Gambia?

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Declaration of Authorship

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Prague, June 14, 2014

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Abstract

The Gambia, a small open economy, implements a managed floating exchange rate regime. The central bank (CBG) has the mandate to design and implement monetary policy with the primary aim of achieving price and exchange stability in the economy. In spite of interventions by the CBG, the country continues to experience fluctuations in its exchange rate with several instances of major spikes in recent years.

This thesis proposes a solution, through a change of policy regime, to control the long time and disturbing depreciation of the domestic currency. In a vector auto regressive framework, the study investigates sources of the exchange rate variability using quarterly data from 1998:Q1 to 2012:Q4. Furthermore, the OCA theory and the pre conditions of inflation targeting are used to make a choice between a common currency and inflation targeting for the Gambia.

The findings from the Johansen test of cointegration suggest that the selected key macroeconomic variables are cointegrated, meaning, they have long run equilibrium. The results of the VECM reveal that error correction mechanism can be achieved in some of the variables. This indicates that there exists the convergence process. In addition, the results from the impulse response analysis put forward that the macroeconomic variables have effect on exchange rate fluctuations, like wise exchange rate has effect on them.

The study relies on a comprehensive classification of de facto behaviour, gathered by the IMF and available literatures for the Gambia to assess the fulfillment of the OCA criteria and initial conditions of inflation targeting. We found out that the country does not satisfy most conditions to enter into a common currency. Also, our reviews indicate that central bank independence in Gambia has been mainly hindered by fiscal dominance through financing of budget deficits as a lender of last resort. However, we conclude based on the current situation of the macroeconomic fundamentals in the country that inflation targeting is the appropriate monetary policy regime for the Gambia.

JEL Classification C32, E42, E52, F31

Keywords: Common Currency, Foreign Exchange, Inflation Targeting, Monetary Policy, Vector Autoregressive

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Contents Page

List of Tables Page

List of Figures Page

Acronyms

ADF	Augmented Dickey Fuller
CBG	Central Bank of The Gambia
CPI	Consumer Price Index
GDP	Gross Domestic Product
IMF	International Monetary Fund
IT	Inflation Targeting
MP	Monetary Policy
MPC	Monetary Policy Committee
NFA	Net Foreign Assets
OCA	Optimum Currency Area
TB	Treasury Bill
VAR	Vector Auto-Regression
VECM	Vector Error Correction Model
WAEMU	West African Economic and Monetary Union
WAMZ	West African Monetary Zone

Master Thesis Proposal

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Defense Planned:	June 2014

Proposed Topic:

What is the appropriate Monetray Policy regime for The Gambia?

Topic Characteristics:

The Gambia is an open economy where monetary policy regime dates back to 1986. Ever since, the country followed a managed floating exchange rate regime. Effective June 30, 2002, the IMF reclassified The Gambia's exchange rate arrangement from independently floating to a managed float with no predetermined path.

Among the primary objectives of the Central Bank of the Gambia (CBG) are: To achieve and maintain price stability and To promote and maintain the stability of the currency of The Gambia as stipulated in the CBG Act 2005. Currently, CBG applies a monetary targeting framework. It sets an intermediate target for growth in broad money (as nominal anchor) and uses reserve money as its operating target. Treasury bills are used as the main instrument for managing reserve money growth. In addition, the CBG uses other instruments such as reserve requirements and purchases/sales of foreign exchange to influence liquidity conditions in the market.

Though inflation has been kept low in the Gambia compared to the rate in other countries within the sub region, the Dalasi (national currency) has been depreciating vis-à-vis the major currencies in the recent years. This has affected the re-export sector of the economy and also made the country to be disadvantaged in its imports.

In spite of interventions by the CBG, the Gambian economy continues to experience several instances of exchange rate instability *with several instances of unreasonable spikes* in recent years. To react to or control the depreciation of the Dalais, external forces such as press releases from the office of the President have to intervene. The problem of the exchange rate instability warranted The Monetary Policy Committee of the Central Bank of The Gambia to hold an emergency meeting recently on Friday, June 21st 2013 to discuss current macro-economic developments and re-assess short-term policy options as reveled by a press release from the Central Bank.

Monetary Policy framework in The Gambia has not been mainly based on empirical studies. It is unlucky that no research publication was used as a foundation for monetary policy formulation. Even though situations before differ from today, the basis of this policy in The Gambia has been on successful experience of what worked in previous periods which in many cases fail to factor in macroeconomic dynamics.

Understanding the causes or sources of exchange rate fluctuation helps to reduce their risk from serious situations and recurrences. Also, policy makers are able to design instruments or strategies to intervene earlier in the exchange rate fluctuation before it worsens. Hence, I will like to investigate the sources of exchange rate fluctuations in the Gambia. Furthermore, since this is a recurring problem, I shall also look into the possibility of the Gambia adopting Monetary union (exchange rate targeting) or Inflation Targeting as optimal monetary policy regime to end or minimize the recurrent depreciation of the dalasi. I will use data from the Gambia Bureau of Statistics and Central Bank on relevant indicators and also refer to MP related documents.

Hypotheses:

1. Hypothesis #1: Exchange rate has positive relationship with money supply
2. Hypothesis #2: Exchange rate and inflation (CPI) are positively related
3. Hypothesis#3: Exchange rate and real output (GDP) are negatively related
4. Hypothesis #4: Inflation Targeting is a better option for the Gambia

Methodology:

For investigating the sources of exchange rate fluctuations, I will examine macroeconomic variables that influence the exchange rate fluctuations. I will use the VAR model with exchange rate, GDP, CPI, broad money supply and rediscount rate as variables. I intend to test for co integration between these macroeconomic variables and apply variance decomposition to identify structural shocks followed by Impulse response analysis.

In the second part, I will do a theoretical assessment of the economy in line with the preconditions for implementing inflation targeting, its advantages and disadvantages. I will also look at the advantages and disadvantages of exchange rate regime in light of the Gambian economy so as to come up with an optimal monetary policy regime that will end the bothering problem of instability of the exchange rate faced by the country.

CHAPTER 1: INTRODUCTION

Monetary policy is an important element of the overall macroeconomic policy framework for each country. Since different monetary policy regimes exist for different countries, the choice of a regime is essential. Monetary policy is used to influence via its tools the outcomes of key macroeconomic variables like the economic growth, unemployment, inflation and the exchange rates.

Exchange Rates are vital for any country's price developments and international competiveness. They co-determine the level of imports and exports, and thus have an important effect on economic developments as well as the balance of payments. The volatility of exchange rate may have adverse consequences both at the micro- and macro-economic level. Thus exchange rate stability offers an advantage to a country because it rules out exchange rates uncertainty.

The regime changes towards floating exchange rates in 1973 after the collapse of the Bretton Woods system resulted in highly volatile exchange rates. Both policymakers and academics continue to have relentless cause of unease on this increased volatility. In the 1980s, developed countries battled firm to limit the US dollar fluctuation and some European countries went as far as giving up their national currency for the euro in 1999. Ever since the end of the Bretton Woods System, studies on both exchange rate determination and its causes have attracted researchers from the academia as well as practitioners. One can attribute this great attention to the huge impact exchange rate volatility has on the economy at large.

The Gambia, a small open economy, implements a managed floating exchange rate regime with no predetermined path as classified by IMF in 2002. The exchange rate depreciated rapidly in 2000 to 2003 due to lax fiscal and monetary policies; however, from 2004 it was appreciating in response to prudent macroeconomic policies but depreciating again in recent years. As indicated in the IMF staff report for the 2013 article IV consultation, the flexible exchange rate policy implementation has been compromised by exchange rate directives between October 2012 and August 2013. Currently, The Central Bank of The Gambia (CBG) applies a monetary targeting framework. It sets an intermediate target for growth in broad money (as a nominal anchor) and uses reserve money as its operating target. Treasury bills are used as

the main instrument for managing reserve money growth. In addition reserve requirements and purchases/sales of foreign exchange are used to influence liquidity conditions in the market.

Inflation has been kept low compared to the rate in other countries within the sub region but the Dalasi (national currency) has been depreciating vis-à-vis the major currencies in recent years. This has affected the re-export sector of the economy and also made the country to be disadvantaged in its imports. In spite of interventions by the CBG, the country continues to experience exchange rate instability *with several instances of major spikes* in recent years. To control the depreciation of the Dalasi, verbal interventions from the office of the President have been employed.

The Monetary Policy framework in The Gambia has not been mainly based on empirical studies. It is unfortunate that no research publications were used as a foundation for monetary policy formulation. Even though the situation before differs from today, the policy has been based on experience of what worked in previous periods which in many cases fail to factor in changing macroeconomic dynamics.

Understanding the causes or sources of exchange rate fluctuation is vibrant for reasons such as:

1. Avoiding exchange rate directives that could result to serious disruptions in the foreign exchange market

2. Ability for early design of policy instruments or intervention strategies before it worsens.

Furthermore, the frequent episodes of spikes in exchange rates, which have hypothetically important economic consequences for international trade and macroeconomic stability, need to be addressed. This can only be done through a vibrant exchange rate policy implementation. Another point is that as the country considers joining West African Monetary Zone (WAMZ) which is a matter of common monetary policy and as this study gives a picture about the fluctuations of its exchange rates, it is necessary to examine if this is best, or whether an alternative

monetary policy such as inflation targeting is a better option for The Gambia for the purpose of economic growth.

In line with the problem statement, the objective of this thesis is in two folds.

1. To investigate the sources or causes of exchange rate fluctuations in the Gambia and
2. To explore the possibility of the country in adopting a Monetary Union or Inflation Targeting

This is because limited research has been done in the area of monetary policy exclusively on The Gambia. Hence this study will provide a thorough insight of the exchange rate volatility problem which continues to challenge the mandate of the CBG and frequently appears in both the electronic and paper media. This thesis shed some light on what we could refer to as 'the real exchange rate fluctuation puzzle'.

This paper consists of the following chapters:
After this Introduction, Chapter 2 contains literature review and the theoretical framework. It is divided into 5 parts. The first part provides literature on previous studies with related models as in this study, the second part is an empirical review of similar studies, then the third and fourth parts present theoretical framework about exchange rate regime and volatility respectively whilst the fifth sub-section shows the relationship between exchange rate and selected macro-economic variables including CPI, GDP, broad money supply and rediscount rate.

Chapter 3 analyses current monetary policy, growth and exchange rate developments in The Gambia. Presented are macro-economic performance, institutional and monetary framework, design and implementation of the monetary policy, instruments of the monetary policy and lastly exchange rate developments.

Chapter 4 describes the data and econometric models. All the variables used in the study are defined. In the second part, the VAR methodology is described and compared to other models used in similar studies and then the model specification is outlined.

Chapter 5 mainly examines the sources of exchange rate fluctuations using the VAR with its applications such as co integration test, variance decomposition and impulse response analysis. It also present summary of findings.

Chapter 6 presents the second part of the study (common currency or Inflation targeting for The Gambia). It presents IT, advantages and disadvantages of both IT and ER, and then analyses both regimes in relation to the economy of the Gambia.

Chapter 7 provides the conclusion and policy implications.

CHAPTER 2: LITERATURE REVIEWS and THEORETICAL FRAMEWORKS

2.1 Previous studies with Related Models to this Study

Exchange rate impacts inflation, output via the price competitiveness, income factors such as interest rates and capital gains from returns including domestic securities. Its fluctuation similarly influences FDI via relative wage channels and relative wealth channels. Among the prominent changes in the behaviour of exchange rates has been the noteworthy increase in their volatility that followed the end of the Bretton Woods system in 1971. The question of what are the causes of exchange-rate variability needs an answer. In recent times, there exist a number of studies explaining the sources of exchange rate fluctuations both in advanced and developing economies. For example, Enders and Lee (1997) decomposed real and nominal exchange rate movements into components prompted by real and nominal factors for the U S, Germany, Canada and Japan in the post Bretton Woods's system. They followed the method applied by Blanchard and Quah (1989)[1] to estimate a restricted BVAR model with monthly data from January 1973 to April 1992 and found out that real shocks account for most of the real and nominal exchange rate movements. Ancillary evidence found out that government spending shocks have been an important source of exchange rate fluctuations in the post Bretton Woods's system and that for low inflation countries such as their sample where nominal shocks are minimal; such shocks have little explanatory power for exchange rate changes. They concluded that income levels, money supplies and interest rates were recognized as the essential causes for exchange rate movements, and thus aggregate demand shocks are responsible for the bulk of the fluctuations.

Morales-Zumaquero (2005) used a SVAR model to describe the sources of real exchange rate fluctuations for a set of advanced economies during two sub periods, 1973:1 to 1990:12 and 1991:1 to 2000:1 and for a set of selected Central and Eastern European transition economies during the period 1991:1 to 2000:1. He found out that real shocks play a central role in explaining the movements of the real

[1] See Blanchard, O. and Quah, D. (1987) The dynamic effects of aggregate demand and supply disturbances. American Economic Review 79,655-673

exchange rate and that nominal shock are slightly more important for explaining the forecast variance in nominal exchange rates. Moreover, for the period 1991:1−2000:1 (developed nations), his results suggest that a large proportion of the real exchange rate movements were due to nominal shocks. Moreover, the results of his impulse response analysis indicated that for advanced economies, during the period 1973:1-1990:12, a smooth increase in real exchange rates was due to real shocks. Additionally, he found out that nominal shocks cause an unnoticeable effect on real exchange rates consequently ruling out evidence of overshooting. Other the other hand, he found out that during the transition period, nominal shocks tend to cause an increase in real exchange rates which indicates an evidence of overshooting.

Juvenal (2011) used structural vector autoregressive model with sign restriction to investigate the role of real and monetary shocks on exchange rate behaviour of the US vis-à-vis the rest of the world. For the variance decomposition of the real exchange rate, he found out that monetary shocks illuminate minimal exchange rate fluctuations and supply shocks play a modest role whereas demand shocks explain a large proportion of the variance of the real exchange rate at both short and long horizons. His impulse responses analysis of relative output, relative consumption, relative price levels, relative interest rates, the real exchange rate, and the trade balance to the different shocks reveal that a productivity shock produces an increase in relative output and relative consumption whereas, relative prices and relative interest rates decline and the trade balance displays a continuous decline. The response of the real exchange rate to relative output was insignificant because a demand shock prompts a rise of nearly 0.4 percent in relative output and an increase in relative consumption. For a monetary policy shock, he found an evidence of a decrease in relative interest rates and a momentary depreciation of the US dollar. Also this shock results to a momentary positive effect on relative output and relative consumption but relative prices display a persistent rise. His findings in relation to sign restrictions indicate that demand shocks are the most important cause of real exchange rate fluctuations both at short and long horizons, supply shocks are moderate determinants and monetary shocks are insignificant in the real exchange rate fluctuations.

Bhundia and Gottschalk (2003) investigated the sources of exchange rate fluctuations in South Africa (rand)-U.S. dollar using a three variable VAR model with

quarterly data from 1995 to second quarter of 2002. Their variance decomposition for the rand-U.S. dollar exchange rate indicates that in the short run, unanticipated changes in the nominal exchange rate are almost exclusively as a result of nominal disturbances explained by the large initial effect these disturbances have on the exchange rate compared to the other disturbances. Furthermore, they presented that at the one year horizon, nominal disturbances still explain close to 60 percent of the variance decomposition. Nonetheless, at the two-year horizon, they found out that nominal disturbances account for just about one third of the variance decomposition. In addition, they indicated that real demand disturbances are the most important source of unanticipated fluctuations in the nominal exchange rate at this horizon and in the long run, the role of nominal disturbances is also taken over by aggregate supply disturbances. Analysing the cumulative impulse responses of the output and price, real exchange rate, and nominal exchange rate to the aggregate supply disturbance, real demand disturbance and nominal disturbance, their findings reveals that for the response to the supply disturbance, the increase in output in South Africa relative to the United States is complemented by a relative decline in the price level in South Africa. Also, the real exchange rate at first appreciates marginally in response to the supply disturbance, but prominent and persistent depreciation was later noticed; reported by the authors as the long-run response predicted by Clarida and Gali's model. In addition, they found out that the nominal exchange rate depreciates in the long run, but by less than the real exchange rate which they associated to the negative price response. For the response to a positive real demand disturbance, they established evidence of an increase in output, an increase in the price level, and an appreciation of both the real nominal exchange rates which contradicts the findings of the response to the supply disturbance. Finally, for the response to the nominal disturbance, they noticed that the output response lasts for about a year, and is complemented by a large depreciation of the nominal and real exchange rate. But they observed that the nominal disturbance is followed by a persistent increase in the price level, and, subsequently, in the nominal exchange rate. Bhundia and Gottschalk (2003) found an evidence of a large unanticipated depreciation of the rand in 2001. Their historical decomposition analysis indicates that nominal disturbances describe almost all of the fluctuations in the rand noticed in the second half of 2001 and the first quarter of 2002. They pointed out that these nominal disturbances could be from the domestic

economy or from the U.S. which may be due to monetary policy actions or result from disturbances in the financial markets.

Hamari, S and Tanizaki, H, examined the sources that are behind exchange rate fluctuations in six sub-Saharan African countries using bivariate SVAR. With monthly data from January 1990 to July 2003, they concluded that real shocks have a meaningful role in driving changes in real exchange rate in all the countries sampled. Adom et al (2012) studied the impact of (real) demand shocks, (aggregate) supply shocks, and monetary shocks on real exchange rates with quarterly data from 1976:1 to 2008:4 in thirteen West African countries using the SVAR. They noticed that the real demand shocks describe the greatest part of the fluctuations in real exchange rates (RER) in all these countries. The impacts of the three shocks considered in this paper that is real demand , aggregate supply and monetary on the RER fluctuations for each country were deliberated on. In the case of the Gambia, the RER was observed to increase immediately by about 0.3 percent in response to a real demand shock and after 20 quarters the marginal effect on the RER was zero. The impact of supply and nominal shocks resulted in no change in the first three quarters, after which a very mild change occurs in the RER. The VDC results explained that more than 95 percent of variations in RER were as a consequence of variations in real demand. Thus the real demand is the main cause of changes in RER. Adom et al (2012) concluded that policies that stabilize fluctuations in real demand will reduce large instabilities in RER for the Gambia.

Focusing on the Gambia since it is the subject of this study, limited empirical research that deals with monetary policy in the country exists. One published is Sriram (2009) ‘The Gambia: Demand for Broad Money and its Implication for Monetary Policy Conduct’, an IMF working paper. With regards to explicit studies on causes of exchange rate fluctuations exclusively for the Gambia, there is none. Therefore, references are made to cross country analysis especially those conducted within the ECOWAS region. The Gambia like many small open economies is often subject to various shocks. The country depends on revenue from foreign trade but frequently experiences variability in its exchange rate. Thus it is very important to empirically determine the causes of these fluctuations for proper actions, management and decisions as envisage in this thesis.

2.2 Empirical Studies

Among the forces that explain exchange rate fluctuations are macroeconomic factors. There are quite a number of studies that empirically explored the sources of exchange rate volatility. With the help of Vector Autoregressive (VAR) framework, this study investigates sources of exchange rate fluctuations in The Gambia using five macroeconomic variables. VAR Model is often used to examine the relationship between macroeconomic variables and further explain their relationships in aspects such as variance decomposition, impulse responses, co-integration, error correction mechanism and causality tests. Since its advocating by Christopher Sims[2] in 1980, VAR models have been commonly used in empirical studies of macroeconomics variables like this one. Sims (1980) empirically estimated a six variable dynamic system without using theoretical perspectives. He argued that larger scale macro-models can be estimated as unrestricted reduced forms considering all variables as endogenous. With this argument, he employed an alternative style of macro-econometrics instead of using the then common theoretical perspective in this study. He used quarterly data on GNP, money supply, unemployment rate, wages, price level and import price for West Germany (from 1958 to 1976) and U.S (from 1949 to 1975). He strongly criticized the claims and performance of earlier modelling in macroeconomic econometrics and also raised doubt on the exogenous assumptions for some variables without theoretical background. Grounded on these opinions, Sims (1980) promoted VAR models as providing a theory-free method to approximate economic relationships, as an alternative to what he referred to as 'incredible identification restrictions' in structural models. The methodology is now extensively used in all categories of empirical macroeconomic studies. For instance, Lastrapes (1992) empirically determined the sources of fluctuations in real and nominal exchange rates in six countries namely U.S, W. Germany, U.K, Japan, Italy and Canada using the VAR frame work. He used monthly time series data of nominal exchange rate, real exchange rate and price level for these countries from

[2] Christopher Sims in 1980 advocated VAR models, criticizing the claims and performance of earlier modelling in macroeconomic econometrics. He recommended VAR models, which had previously appeared in time series statistics and in system identification, a statistical specialty in control theory

March 1973 to December 1989. He found no co-integration between real and nominal exchange rates (relative prices and non-stationary) for all the countries except U.K. His conclusion suggests that fluctuations over the current flexible period in real and nominal exchange rates are due mainly to real shocks at all frequencies.

Karras et al (2005) examined whether the remarkable increase in exchange-rate variability in the post Bretton Woods period is due to a less firm structure (the propagation mechanism) or more unstable shocks (the impulses). They employed a reduced form of VAR model on selected developed countries with periods divided into the Bretton system and post Bretton system. To find out the relationship among macroeconomic variables such as exchange rate, money stock (M2), fed funds rate and industrial production with this model, they used data (monthly and quarterly) from 1957 to 1971 and labelled it as the first period- low volatility, which is under the Bretton Woods system. The second period was categorized as floating exchange rates with high volatility from developed countries, specifically the US, Canada, Germany, and the UK with data from 1973 to 2000. Their findings propose that the downfall of the Bretton Woods system resulted in an increase in exchange rate volatility that could be explained by structural changes like regime switching and rise in unpredictable vicious economic shocks. Another outcome of their study was that more vicious shocks are the sole causes of the increased exchange rate volatility. Their results finally indicated that post Bretton Woods period exchange rate volatility are to a greater extent associated with the notion of impulse rather than propagation.

Wang (2005) studied the relative importance of different types of macroeconomic shocks for fluctuations in the real exchange rate in China using the SVAR model. He used a three variable VAR - relative output, the real effective exchange rate, and the relative price level with annual data from 1985 to 2003 and two lags of each variable. He performed the co-integration test using the Johansen's maximum-likelihood procedure and found no evidence of co-integration among the three variables. His results of the variance decomposition showed that relative real demand and supply shocks account for most of the variations in real exchange rate changes during the estimation period. He analysed the impulse response functions for the log levels of relative output, the real exchange rate, and the relative price level for a one standard deviation structural shock. The empirical evidence indicates that for the real

exchange rate, a positive supply shock leads to a permanent decline, while a positive real demand shock is associated with a permanent appreciation. Again, a positive nominal shock has a temporary depreciating impact on the real exchange rate but no long-run effects due to the restriction imposed. Contrasting Morales-Zumaquero (2005), his results of the impulse response analysis indicated that real shocks are equally significant as nominal shocks in accounting for real exchange rate fluctuations. An interesting outcome of this study was that China operated a fixed exchange rate system during the period under study and the initial depreciation of the real exchange rate in response to a positive nominal shock is not consistent with standard theoretical predictions for a fixed exchange rate system. Wang (2005) associated this inconsistency with the use of annual data that may have concealed the immediate impact of the shock.

Ahmad and Pentecost (2009) empirically investigated the major sources of real exchange rate fluctuations in nine African economies and the degree to which economic policy can be used to help moderate real exchange rate fluctuations in these economies. They applied a trivariate (real output, real exchange rate and prices) SVAR methodology with quarterly data for from 1980 to 2005. In the early stages, they performed the Johansen cointegration test for the variables and the result indicated non-existence of cointegration. Due to the lag length sensitivity of VAR, information criteria were used to decide on the optimal lag length and three was ideal. The impulse response functions to a one standard deviation structural shock for all the sampled countries showed that in all countries, positive relative demand shocks resulted in real exchange rate appreciation, however the magnitude and the persistence varied from country to country. It additionally indicated that the effects of both supply shocks and nominal shocks on the real exchange rate are relatively small. To determine the relative importance of shocks for a given variable change, they applied forecast error variance decompositions and found out that relative demand shocks are more important than the relative supply shocks in explaining exchange rate fluctuations to a large extent for Botswana, Ghana, Kenya, Morocco, Nigeria and Tanzania and also to a moderate level for Algeria, Egypt and South Africa.

2.3 Exchange Rate Regimes

An exchange-rate regime is the way a sovereign state manages its currency (domestic) in relation to other currencies (international) and the foreign exchange market. In the same way, it is closely related to monetary policy and both are commonly contingent largely on the same factors. Exchange rate regime exits in almost all countries because each nation needs a way to manage its currency. Exchange rate regimes can be categorized into two main classifications: fixed exchange rates and floating exchange rates (Ghatak, 1995). A discussion of the characterizations of the two different exchange rate regimes follows.

2.3.1 Fixed exchange rate regime

From 1946 to the early 1970s, the Bretton Woods system made fixed currencies the custom but, in 1971, the United States government would no longer uphold the dollar exchange at 1/35th of an ounce of gold, so that the US dollar was no longer a fixed currency. After the 1973 Smithsonian Agreement[3], most of the world's currencies followed suit. Nonetheless, some countries still fix their currency with another currency. For example, the French speaking ECOWAS countries still have their currency (the CFA franc) fixed to the Euro.to the French franc.

Under fixed exchange rate regime, the monetary authorities fix the rate between the domestic currency and the foreign currency or a basket of currencies. If there are pressures on the rate to change, for instance to depreciate (that is the need for more domestic currency to buy one unit of foreign currency) because there is excess demand for foreign currency , then the monetary authorities of the domestic country will have to intervene in the foreign exchange rate market by selling its FX reserves and buying the domestic currency(Ghatak, 1995). Most domestic currencies are tied commonly to more widespread currencies such as the U.S. dollar or the euro or a basket of currencies. In case of a currency board arrangement, the domestic

[3] The **Smithsonian Agreement** was a December 1971 agreement that adjusted the fixed exchange rates established at the Bretton Woods Conference of 1944. Although the other currencies were still pegged to the dollar until 1973, the main difference from the previous regime was the abolition of the dollar's convertibility into gold guaranteed by U.S. Treasury, making the dollar effectively a fiat currency.

currency is backed one to one by foreign reserves. Countries that have adopted another country's currency and abandoned its own also fall under this category.

Among the noteworthy advantages for the choice of this type of regime are price stability and exchange rate stability. Central banks fix the value of their currency to that of a low-inflation country to attain price stability. Exchange rate stability anticipated under the fixed exchange rate regime helps to lower inflation expectations. On the other hand, the commitment to a fixed exchange rate requires a nation to surrender control over its own monetary policy and inflation rate (McCallum, 1989). There is thus a trade-off between reducing exchange rate volatility and foregoing an independent monetary policy with this regime (Ghosh et al., 2002). Essentially, there are many versions of fixed exchange rate system such as currency board and dollarization.

2.3.1.1. Currency Board

A currency board is a system in which the monetary authority is strictly required to sustain a fixed exchange rate with a foreign currency. The board is expected to convert domestic currency into foreign currency on demand at a fixed rate. This policy objective requires the conventional objectives of a central bank to be subordinated to the exchange rate target. Classically, currency board have advantages for small, open economies which would find independent monetary policy difficult to endure. It is associated with improvement in inflation performance. For instance, currency board was among the programs used to end economic turmoil and near hyperinflation in Bulgaria (Gulde, 1999).

However, the drawbacks with this system are that the country no longer has the ability to set monetary policy according to other domestic considerations, and that the fixed exchange rate will, to a large extent, also fix a country's terms of trade, regardless of economic differences between it and its trading partners. Another disadvantage is that if the real exchange rate becomes significantly overvalued under currency board, it becomes very difficult to correct it because the adjustments must come exclusively from declining domestic costs and prices with no help from nominal exchange rate (Goldstein, 2002). For example, the British Overseas

Territories of Gibraltar, the Falkland Islands and St. Helena operate currency boards, backing their locally printed currency notes with pound sterling reserves.

2.3.1.2. Dollarization

Dollarization occurs when the inhabitants of a country use foreign currency in parallel to or instead of their domestic currency. The term is not only applied to usage of the United States dollar, but generally to the use of any foreign currency as the national currency. The major currencies used as substitutes are the United States dollar, the euro and the Swiss franc. Supporters of dollarization argue that it is an ideal regime for a wide range of developing countries but up to date, experience has been limited to moderately minor group of small developing countries. Ecuador, El Salvador and Montenegro in Europe are developing countries with officially dollarized regime (Goldstein, 2002).

The major advantage of dollarization is that it offers more improvement to international trade compared to other regimes. Nonetheless, empirical studies have shown that under this regime, the short run exchange rate variability (uncertainty) and the volume of trade for industrial economies are not consistently related; as such the common currency presence seems to have greater effect on the volume of trade than on the degree of exchange rate variability (Goldstein,2002). Henceforth, monetary policy is given up to the anchor country and consequently, the issuing country benefits form increases in seigniorage (Ghosh et al., 2002).

2.3.1.3 Conventional Peg

A soft peg is where a central bank keeps the rate from deviating too far from a target band or value. Pegging the rate to a particular major currency requires movements in the exchange rate of the domestic country that are independent of factors affecting its own external sector or alternatively to fix the rate to a basket of currencies of major trading partners (Ghatak, 1995).

Pegged floats are further classified as crawling bands when the rate is allowed to fluctuate in a band around a central value, which is adjusted periodically. This is done at a preannounced rate or in a controlled way following economic indicators. Otherwise it is classified as crawling pegs when the rate itself is fixed, but adjusted periodically. Crawling peg exchange rate regime is usually seen as a part of fixed exchange rate regimes that gradually allows depreciation or appreciation in

an exchange rate . The conventional peg system is a method trying to find a balance between the advantages of the fixed exchange regimes on the one hand and the flexibility of a floating exchange rate regime on the other hand. In dealing with external pressure such as interest rate differentials or changes in foreign exchange reserves to appreciate or depreciate the exchange rate, the system can make frequent but moderate exchange rate changes to ensure that the economic disruption is kept minimal.

2.3.2. Floating exchange rate regime

Floating rates are the most common exchange rate regime in both developed and developing economies after the end of the Bretton Woods system since the late 1990s. Under this regime, the market dictates movements in the exchange rate based on the demand and supply of the foreign currency (Ghatak, 1995). The currency's value is allowed to fluctuate according to the foreign exchange market. Nonetheless, central banks occasionally intervene to avoid excessive appreciation or depreciation; henceforth such a regime is termed as managed float or a float. There is also the independent floating classification of this exchange rate regime as discussed below. A currency that uses a floating exchange rate is known as a floating currency. Examples include the dollar, euro, yen, and British pound.

2.3.2.1 Managed Floating

Under this regime, the central bank can intervene on occasions. Authorities can use various policies to counter short term movements in the exchange rate. This is to smooth short term fluctuations in the exchange rate and to keep market liquidity (Goldstein, 2002). The intervention might be in order to speed up the movement of the exchange rate towards its equilibrium following a shock, or to affect the direction of the exchange rate movement (Ghatak, 1995). Under managed floating regime, authorities would not try to use large scale purified exchange market interventions to change the trend of the exchange rate which would be determined by market forces or attempt to offset almost all the exchange rate volatility in the exchange rate market because such volatility functions to broaden the awareness of the participants on the market risk (Goldstein, 2002). One way central banks can manage the floating exchange rate is by buying and selling larger amount of foreign currencies to minimise fluctuations. Authorities under this regime try to intervene

without a specific exchange rate path or target. In case the central bank has a target which directs the intervention in the exchange rate market, it is not disclosed in most cases (Ghatak, 1995).

2.3.2.2. Independent floating

Market forces are the main determinant of the exchange rate under the free floating regime. Although this holds for the managed float too but in that case, there are more or less frequent FX interventions. The exchange rate is determined by the supply and demand for foreign currency and authorities rarely intervene. This is to avoid unnecessary fluctuations and exchange rates are allowed to freely adjust and fine tune the optimal rates. The system calls for little or no official reserves and there are no restrictions on the monetary policies (Ghosh et al., 2002).

Connecting the choice of exchange rate regime with resistance to crisis, Rose (2013) found out that monetary regimes (both fixed and inflation targeting) have remained stable and unchanged during the recent global financial crisis and its aftermath for a large number of countries. Furthermore, his findings show that during the crisis, the macroeconomic and financial performance of small countries with hard fixed exchange rates is similar to those that implement float with an inflation target. Both regimes performed better than the soft pegs and other alternatives.

2.4 Exchange Rate Volatility

The increasing volatility of exchange rates after the fall of the Bretton Wood System has been a concern to all especially the academia, policymakers and even politicians. Reflecting back on the features of the two main categories of exchange rate regimes (fixed and floating) that have been described in the previous sub-section, exchange rates are supposed to remain fixed under the fixed exchange rate regime although this is not sometimes the case. However, we expect the exchange rates to float up and down under the floating regime. The degree to which the exchange rate moves up and down (change) is referred to as exchange rate volatility. The greater the magnitude or the more quickly it changes over time, the more volatile it is regarded. Comparing the two main exchange rate regimes, the floating regime is expected to be more volatile than the fixed regime because under

the former, exchange rates are free to change. But the harm to this volatility is less than the potential harm of switching over to a fixed exchange rate regime (Gagnon, 2011)

When we relate exchange rate volatility and the choice of exchange rate regime, countries may opt for fixed exchange rate regime so as to reduce volatility and thus encourage international trade and investment. But this may not be practical in the real world. An IMF study in 2004 pointed out that on average, during the 1970s, 1980s and 1990s; the volatility of fixed exchange rates was almost the same as that of the floating rates. Two reasons were mentioned that could possibly explain this result. The fact that a currency fixed to another reserve currency will continue to float against other currencies was the first point mentioned. The example given was when China pegged its currency to the US dollar and it continues to float with the dollar visa-a-via the euro. The second reason pointed out was the effect of periodic devaluation and revaluation of fixed currencies. It was indicated that when this happens, the effects of volatility are intense in a very short time frame which can have much bigger economic impacts. The study further found out that volatility had only a trivial effect on bilateral international trade flows, proposing that the choice of exchange rate regime on trade flows may not be significant.

Exchange rate volatility affects the economy in several ways both at the micro and macro- economic levels. It increases the potential to lose money because of a change in the exchange rate herein referred to as exchange rate risk. It also disturbs a country's price determination and trade competiveness. For example, volatile exchange rates make international trade and investment decisions more difficult due to the risk associated to it.

Relating exchange rate volatility and international trade, numerous studies, both empirical and theoretical have been conducted to establish the relationship between exchange rate volatility and international trade; that is the import and export of a country but the conclusions are not conclusive. Earlier researches found out that there is no significant relationship between exchange rate volatility and international trade. In order words, this relationship is very ambiguous. Studies such as Hooper and Kohlhagen (1978) concluded a negative relationship in the impact of exchange rate volatility on the volume of international trade. The assumptions in this study

include the degrees of risk aversion of importers and exporters, the currency in which contracts are denominated, and a monopolistic export market framework. Hence, when importers are the risk-bearers, increase in the exchange rate risk results to price reduction. According to the authors, the outcome of this is that importers will reduce their imports because they will now get lesser profit as a result of the reduction in prices caused by the exchange rate volatility. However, when the exporters become the risk bearers, the study shows that they will include a higher risk premium in the price leading to an increase in the price of the commodities.

Later researches in establishing this relationship employed error correction techniques and more disaggregated data to verify the notion that the relationship between exchange rate volatility and international trade is statistically significant. Doyle (2001) found that exchange rate volatility (both real and nominal) has significant impact on both exports and imports.

2.5 Relationship between Exchange Rate and Selected Variables

There exist a number of theoretical frameworks that explain the relationship between exchange rate and macroeconomic variables such as level of output, inflation, money supply, prices, wages, unemployment and interest rates. I examine the relationship between exchange rate and selected macro-economic variables in this sub-section. My choice for GDP, inflation, money supply and rediscount rate is justified by the important role they play in determining the movement of exchange rate.

Exchange rate fluctuations may have a substantial effect on macroeconomic variables. As stated by Parikh and Williams (1998), its significant impact on the macro-economic fundamentals may eventually result in a macroeconomic disequilibrium.

Figure 2.1: Illustration of the relationship between the selected variables.

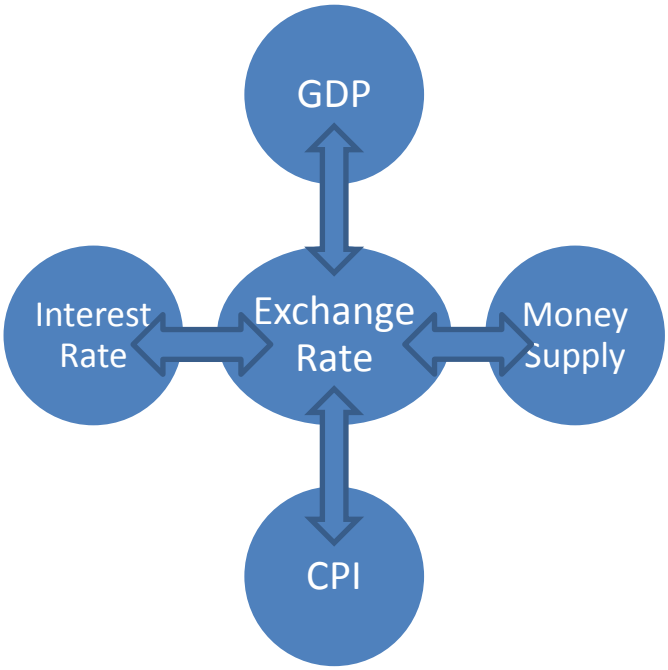


Figure 2.1 demonstrates a graphical relationship between exchange rate fluctuations and macro-economic variables. It explains that in addition to several other factors, these variables influence the fluctuations in exchange rate and likewise, exchange rate variability has effect on each.

I use the Purchasing Power Parity Theory to explain the relationship between inflation and exchange rate, the flexible price monetary model to explain the relationship between GDP, money supply and exchange rate. To examine the relationship between exchange rate and interest rate, I used the concept of the Uncovered Interest Parity (UIP) theory and the Mundell-Flemming model.

2.5.1 Relationship between Exchange Rate and Inflation:

The relationship between exchange rate and inflation has been largely documented by theoretical and empirical studies. The inflation rate of a country increases when the currency depreciate because inflation is inversely related to the value of the currency.

The Purchasing Power Parity (PPP) Theory

Technically, we use the PPP theory to determine the relative value of different currencies and interpreted as the difference in the rate of change in overall price levels at home and abroad, that is the difference in the inflation rates which equals to the percentage depreciation or appreciation of the exchange rate. Taking reference from (Obstfeld and Rogoff, 1996), we can mathematically show this relationship.

I will start by defining the real exchange rate, R, as

$$R = \frac{SP^*}{P} \quad \ldots\ldots (2.1)$$

Where S is the spot rate and P, P^* are domestic and foreign price levels respectively.

Two things are obvious from expression (2.1). First when the foreign price of a bundle of goods rises relative to the domestic price, the real exchange rate will depreciate. Second, when the foreign price of a bundle of goods falls relative to the domestic price, the real exchange rate will appreciates.

A special case is where the real exchange rate is constant over time. Assume that the basket of goods that were produced in the foreign and domestic countries was same and that all goods were tradable (no transportation costs or other trade barriers); hence we have the law of one price and arbitrage would insure that the prices of the various goods would be the same everywhere (Sercu. 2009). This results to the theory of PPP.

We can derive the spot rate from equation (2.1) and it can be written as

$$S_t = \frac{R_t \mathrm{P}}{P^*} \quad \ldots\ldots (2.2)$$

Suppose the real exchange rate is constant over time; therefore $R_t = \overline{R_t}$, we have

$$S_t = \frac{\overline{R_t} P}{P^*} \quad \ldots\ldots (2.3)$$

And it follows that any change in domestic price levels will result to movement in exchange rates. To sum up, PPP determines exchange rate by movements in relative price levels.

2.5.2. Relationship between Exchange Rate and Real Sector

Studies on the relationship between exchange rate and the real sector have been documented for developed as well as emerging economies. For this study, the real sector is represented by the real output. Empirical studies such as Mohammad Ali and Shafiq (2012) found out that an increase in the gross domestic product lowers the home currency depreciation. So the gross domestic product is influencing the exchange rate fluctuation.

The Flexible Price Monetary Model

Let us consider the money demand function for the domestic and foreign country

$$(m_t - p_t)^d = \emptyset y_t - \gamma i_t \quad (2.4)$$

$$(m_t{}^* - p_t{}^*)^d = \emptyset^* y_t{}^* - \gamma^* i_t{}^* \quad (2.5)$$

Combined with money market equilibrium (assuming that the PPP and UIP holds)

$$S_t = (m_t - m_t{}^*) - \emptyset(y_t - y_t{}^*) + \gamma(i_t - i_t{}^*) \quad (2.6)$$

Where m_t = money supply in domestic currency

m_t^* = money supply in the foreign currency

p_t = price level in domestic currency

p_t^* = price level in foreign currency

y_t = real output in domestic currency

y_t^* = real output in foreign currency

i_t = interest rate in domestic currency

i_t^* = interest rate in foreign currency and $\emptyset, \gamma, \emptyset^*, \gamma^*$ are paraemeters

Expressions (2.4) and (2.5) are the monetary equilibrium in the domestic and foreign country respectively. Spot exchange rate is determined by relative monetary velocity. Equation (2.6) is the solution for nominal exchange rate. From this equation, an increase in the domestic prices will result to a nominal appreciation of the domestic currency (Sercu, 2009).

2.5.3. Relationship between Exchange rate and Money Supply

Money demand and supply via the flexible price monetary approach can be used to explain the relation between exchange rate and the financial market. From equation (2.6) above, we can see a positive relationship between nominal exchange rate and domestic money supply relative to the foreign money stock. A rise in the domestic money supply (m_t) relative to the foreign money stock (m_t^*) results to a depreciation of the domestic currency relative to the foreign currency and the reverse hold too (Sercu, 2009).

2.5.4 Relationship between Exchange rate and Interest Rate

The uncovered interest parity theory can be used to explain this relationship. It implies that the expected change in the exchange rate of the domestic currency is the interest rate differential between domestic country and the world.

When interest rate rises unexpectedly, the country's currency immediately appreciates. The main reason behind this appreciation is that more and more people come into the country to invest the more. As featured in the Mundell-Flemming model, higher interest differential would attract capital inflows and result in exchange rate appreciation (Obstfeld and Rogoff, 1996). This summarises that there is a negative relationship between interest rate and exchange rate. After the initial appreciation jump, the exchange rate starts depreciating towards its equilibrium level, which offsets the interest rate differential.

However, some monetarists disagree with this notion and believe that higher interest rate reduces the demand for money which results to depreciation of the currency due

to high inflation. This is supported by Sargent and Wallace (1981). They stated that a high interest rate policy may cause a reduction in demand for money and increase in price level because an increase in interest rate point toward an increase in government debt that would be financed by seinorage, hence there will be exchange rate depreciation.

CHAPTER 3: ECONOMIC PERFORMANCE AND MONETARY POLICY

3.1 Macro- economic Performance

The Gambia is an open economy where agriculture and the tourism industry continue to be the main drivers of economic growth. According to Sriram (2009), the performance of the economy had not been smooth between 1988 and 2007. He reported that, real GDP growth averaged 4.5 percent and inflation 6.6 percent a year during these periods, with significant variation from year to year. According to him, the country experienced a severe economic crisis in the mid-1980s mainly due to the increasing effects of two decades of unsustainable macroeconomic policies, aggravated by droughts and deterioration in the terms of trade. In addition, he detailed out that comprehensive adjustment programs[4] that were implemented to restore stability led to significant improvements in economic performance in 1993 regardless of continued poor rainfall and low world groundnut prices.

Furthermore, Sriram (2009) pointed out that the economy went back to a state of crisis after 1993 through 1996 due to numerous hostile shocks such as reinforced border and transit controls in Senegal, the 50 percent devaluation of the CFA franc in 1994, and a drop in foreign aid and tourism after the 1994 military coup.

Political stability was established after elections in 1997 and 2001 and the economy realized moments of growth between 1998 and 2001 although immediately afterwards very bad weather led to a 3 percent decline of real GDP in 2002 but growth in real GDP recovered again in 2003 as stated by Sriram (2009).

In the face of the global economic crisis, economic activity in the Gambia performed well for many years even though the real GDP declined in 2005 by 0.9 percent. It picked up in 2008 with a growth rate of 5.7 percent, as a result of strong growth in agriculture, tourism, and the construction industry.

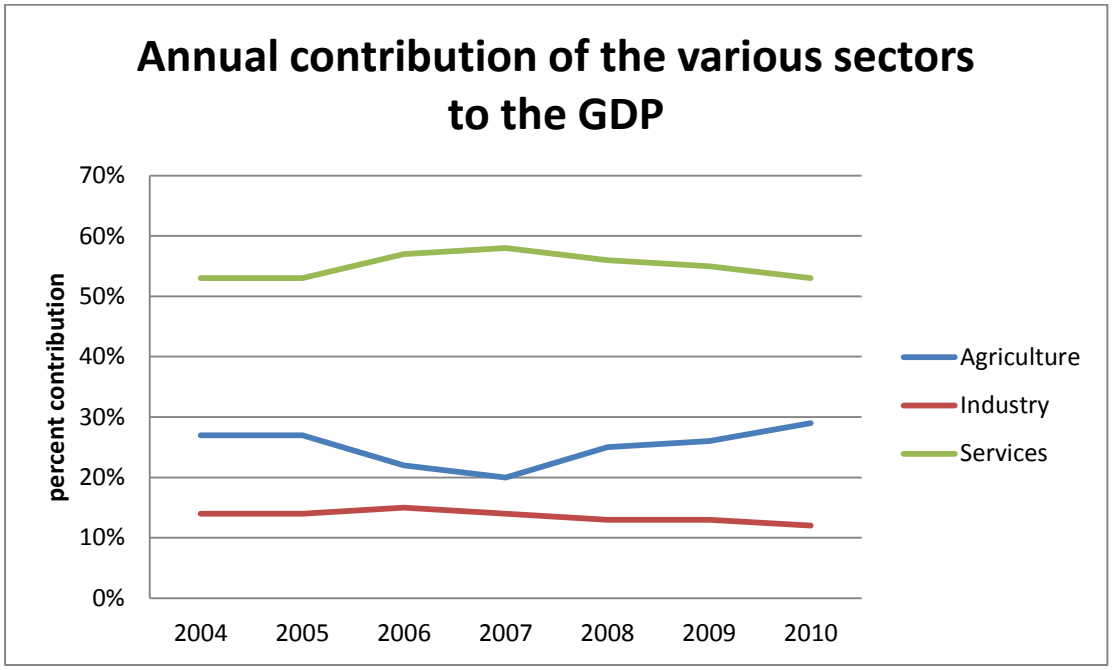
With regards to the disruptions by 2007/08 global financial crises, the country also had its share as a developing economy. Although the first round of the effects of the crisis did not affect the domestic financial system negatively, the key indicators of the economy started to drop by the mid of 2008. Income from tourism, exports and foreign direct investment all declined. The current account deficit widened causing a

[4] The Economic Recovery Program (ERP) in June 1985 and it was followed by the Program for Sustained Development in 1990

drop in the overall balance of payments revealing a projected decline in the growth of the economy (CBG Annual Report, 2008).

Highlighted in the 2013 IMF article IV consultation staff report, average real GDP growth between 2007 and 2010 was around 6 percent a year. This was largely attributed to expansion in agriculture and great investment in the telecommunications sub sector. Unfortunately, the country experienced drought in 2011 that led to poor harvest and as a result, real GDP dropped to about 4 percent in 2011. With brightness in the tourism sector and reverberation in agriculture (crop production increased by 30 percent), the economy revitalized in 2012 with real GDP growth of around 6 percent[5].

Figure 3.1: Annual contribution of the three broad sectors to the GDP



Source: Author, based on data from GBoS

Figure 3.1 shows that the industrial sector's contribution to GDP was around 14 percent on average between 2005 and 2010. The agriculture and natural resources sector contributed on average approximately 25 percent of GDP from 2004 to 2009. The service sector's contribution has been leading throughout the periods under review. The sector continued to contribute over 50percent of GDP for each of the

[5] The figure quoted is still an estimate at the time of writing

years. Within the service sector, the wholesale and retail trade subsector followed by the transportation, storage and communications subsector dominated and contributed significantly to the outstanding percentage.

As regards the price stability, there was remarkable inflation in 2003. Sriram (2009) indicated that inflation surged from less than 1 percent in 2000 to 21 percent in August 2003 due to fiscal slippages, and accommodating monetary policy. More recently, consumer price inflation slowed to 4.4 percent in 2011 compared to 5.8 percent in 2010. The most recent IMF article IV consultation staff report also specified that inflation has fluctuated between 2.5 and 7 percent (year-on-year) since 2007 owing to the fact that CBG usually exercised monetary restraint. However, there have been periods of monetary expansion driven by fiscal dominance manifested by the end of 2012 when inflation has been rising gradually to 5.8 percent (year-on-year in June 2013).

On the financial front, the country's financial sector is small and the banking sector dominates. The banking industry continued to be stable and attractive. As of 2013, there were 12 commercial banks, 14 insurance companies, 70 savings and credit associations, and 58 FOREX bureaus. It is important to mention that most of these banks are foreign owned. The risk-weighted capital adequacy ratio averaged 28.0 percent, just marginally lower than the 30.0 percent in 2012 (CBG statistics &MPC January 2014 Press Release).

Sriram (2009) pointed out that growth in the financial sector has been sharp since 2000 mainly attributed to strong capital inflows, financial innovation such as residents operating foreign currency accounts, embargo on informal foreign exchange markets and expansion in the banking sector activity both in terms of new banks and branches.

He further indicated that although private debt securities are not common, the country has a government debt securities market in which treasury bills are traded both for liquidity management purposes and to meet the financing requirements of the government. The Gambia has no stock market, even though there exists a small and developing foreign exchange market with commercial banks and foreign exchange bureaus serving as the key players.

Notwithstanding, the total government debt totalled 77 percent of GDP by the end of 2012. Specifically, 34 percent of GDP was domestic debt, mainly short-term debt (T-bills). As of end 2013, the domestic debt increased to 39 percent of GDP. A great

portion of the government resource was consumed by interest on debt and most of which was spent on domestic debt. The government's expenditure on this interest stood at 22.5 percent of government revenues in 2012, of which almost 18.5 percent was paid on domestic debt. (IMF article IV report, 2013 & MPC January 2014 press release).

To sum up, there are growth potentials for the economy even though increasing domestic debt of the Government and the widening trade deficit are threats to economic growth in the Gambia.

3.2 Institutional and Monetary Framework

The Central Bank of the Gambia was established by an act of parliament in 1971. Since then, it operates within the framework of the national constitution and the Act. The Act of 1992 was revised in 2003 and then in 2005 which is the one currently in place. Throughout, the objectives of the bank, classified as primary or secondary are stated clearly in all the issues, and the primary objectives of the CBG Act of 2005 are to;

1. Achieve and maintain price stability
2. Promote and maintain the stability of the Gambian currency
3. Direct and regulate the broader financial system in the interest of the economic development of the country, and
4. Encourage and promote sustainable economic development and efficient utilization of resources of the Gambia.

The secondary objectives focus mainly on promoting economic growth. A comprehensive part of the secondary objectives as mentioned in the Act is that without prejudice to the primary objectives; the bank shall support general government policy and promote economic growth and effective and efficient operation of a financial system in the Gambia (CBG Act, 2005).

To attain the above mentioned objectives, the bank has among its functions that relate to monetary policy; to formulate and implement monetary policy as well as to promote by monetary measures the stabilization of the value of the domestic currency.

Among the primary objectives of the Central Bank of the Gambia, much attention is given to price stability followed by the stability of the national currency. Currently, CBG applies a monetary targeting framework. It sets an intermediate target for growth in broad money (as nominal anchor) and uses reserve money as its operating

target. Multiple instruments are used for managing reserve money growth to achieve price and exchange rate stability.

3.3 Design and Implementation of Monetary Policy

The design and implementation of monetary policy is a key function of the CBG in order to achieve its primary objectives of price and exchange rate stability. On the outlook for inflation, the implementation of monetary policy is done in a forward looking manner whereas that of exchange rate stability is done in a reverse order.

The bank sets intermediate broad money target after defining objectives. It aims at reserve money aggregate as an operational tool which it influences using several policy instruments to attain broad money targets. A monetary policy committee (MPC) is in place that meets regularly. The committee decides on the rediscount rate putting into consideration future and present economic outlooks of both the foreign economies and the domestic one. The Bank then uses the rediscount rate decisions of the MPC to signal changes in its policy stance. The committee monitors the situation of the economic outlook for possible review of the policy rate.

However, with challenges in predicting and understanding the source of shocks on the domestic economy (most often external shocks), the desired effectiveness of the signalling strategy used by the bank may not be fully achieved. In implementing its framework, CBG also constantly monitors the dynamics that influence reserve money, to be precise, the Net Domestic Assets (NDA) of the Bank and the Net Foreign Assets (NFA) and endeavours to achieve actual reserve money close to its set targets.

Besides the reserve ratio requirement, series of interest rates (such as the Treasury bill rates, bank rate and CBG secondary sales rate) are also connected to the policy rate. Among the range, CBG's main discretionary monetary policy tool is the primary sale of the CBG and treasury bills.

The financial system is core in the implementation of the monetary policy. The agreed signal rates together with the reserve ratio requirements are assumed to function through the financial system to impact the demand for money by the economic agents. Based on this, the MPC will raise the policy rate if they want to implement a contractionary monetary policy and lower it if an expansionary monetary policy is chosen.

Great achievements were recorded with the monetary policy. Though in recent years inflation has been kept low in the Gambia compared to the rate in other countries

within the sub region, it had been significantly high in 2003 through 2004. During this period, inflation continued to rise, ranging from 10 percent in the first quarter of 2003 to 18 percent in the first quarter of 2004. A disinflation process started in 2005 and the monetary policy in 2006 was focused on sustaining that disinflation process. During the period, the conduct of the policy was done mainly through the auction of treasury bills, which successfully served as the instrument of open market operations. Consequently, inflationary pressures were controlled but the domestic currency depreciated weakly which further led to interest rate reduction. Also, in October the same year, the Bank reduced the reserve requirement ratio from 18 percent to 16 percent with the aim of offering extra liquidity for investment (CBG Annual Report, 2006).

Again, in reaction to rising inflationary pressures due to the global food and fuel crisis and signs of stress in the markets for government securities during the 2007/08 financial crises, the MPC decided to tighten the policy in October 2008 (by raising the rediscount rate from 15 percent to 16 percent). Between October and December 2008, CBG provided substantial amounts of FOREX to the banking system to inject foreign exchange liquidity and reduce the exchange rate volatility (CBG Annual Report, 2008).

Of recent, the economy underwent three notable policy challenges towards 2011 as mentioned in the 2011 CBG annual report. To start with, there was the fiscal policy expansion in the final quarter of 2009 and in 2010. This contributed to an increase in the interest rates on Treasury bills in early 2011, resulting in interest costs to surpass budget allocations. The other one was the monetary expansion in 2009 and 2010, combined with increasing food and fuel prices that made it tough to achieve the 5.0 percent inflation target in the first half of 2011 as predicted. Third was the extra budgetary spending demands that emerged in 2011, remarkably an increase in fuel subsidies to mitigate the impact of rising international oil prices and additional pressures from election related spending and the wage bill.

Countering to the aforementioned policy challenges, strategies were executed to put economic policies on path. Fiscal tightening (restrained spending which dropped below target by 21.0 percent, as well as increased domestic revenue mobilization which recorded a growth of 6.9 percent), were implemented during the second half of 2011. These resulted to an immediate decline in financing from 3.8 percent of GDP in 2010 compared to 2.3 percent in 2011. The increased growth in domestic revenue was as a result of higher personal and corporate income taxes, international trade taxes as well as increases in domestic taxes on goods and services. Monetary

policy was also tightened (partly by mopping up liquidity through net sales of Treasury bills) in 2011 to restraint in inflationary pressures. With this, the Central Bank managed to reduce the monetary policy rate from 15.0 percent to 14.0 percent in October 2011 (CBG annual report, 2011).

Furthermore, developments towards fiscal consolidation were interrupted in 2012 because the fiscal deficit in that year turned out to exceed the budgeted. However, the CBG as lender of the last resort financed the deficit which added to an acceleration of money growth and supposedly contributed to a control in inflation and exchange rate depreciation (IMF article IV report, 2013).

3.4 Monetary Policy Instruments

Monetary policy instruments are meant to nurture short-term liquidity management in the conduct of monetary policy. For proper liquidity management, the policy instruments need to efficiently and effectively function through the money markets and the payment system. When this is attained, the players in the economy build confidence and trust in the central bank. The main monetary policy instruments for CBG are; open market operations, reserves requirements ratio and rediscount rates/ policy rates.

3.4.1 Open Market Operations (OMOs)

The primary instrument of the monetary policy in the Gambia has long been the open market operations, with the Treasury bill rediscount rate functioning as the main signal. OMOs are meant to achieve positive real interest rates, mod up excess liquidity and contribute to price stability. To influence bank liquidity, CBG purchases and sells government Treasury bills as well as its own referred to as CBG bill. Both bills have same features and are offered on a fortnightly basis with maturities of 91, 182, and 364 days. Conversely, whereas the CBG bills are only for monetary policy purposes, the government T-bills also serve as a debt instrument for the government.

OMOs in government securities and CBG bills have effect on the central bank and the broader economy. Selling such securities to the public from the CBG's own holding would drain liquidity from the banking system whereas purchasing them from

the market would raise the banks' liquidity. Commercial banks are the primary dealers in the sales of these bills although few institutions participate too.

In 2004, OMOs were intensified with the aim to considerably reduce inflationary pressures. Again in 2006, it was used successfully to control inflation and ease the pressure on the domestic currency.

3.4.2 Reserve Requirement Ratio

By law, it is mandatory for commercial banks to maintain reserve deposits with the Central Bank. The reserve deposit otherwise referred to as the reserve requirement ratio is the percentage of deposit liability of commercial banks kept in their account with the central bank. A reserve requirement is expected from all financial institutions in the Gambia and it alternatingly serves as a monetary policy tool for CBG. It is an effective tool in a situation when for instance OMOs could not be used to impact the money supply in the economy.

Throughout 2004 to 2005, the reserve requirement was kept at 18 percent of deposit liabilities showcasing the tight monetary policy stance. The MPC decided to reduce the reserve requirement to 16 percent in 2006 and by April 2011, it was further reduced to 12 percent. In May 2012, the MPC decided to reduce the reserve requirement to 10 percent of deposit liabilities with the understanding that monetary policy is suitable to support the real economy while at the same time preserving its obligation to contain inflation.

3.4.3 Rediscount Rate/ Policy Rate

Rediscount rate is the interest charged by the central bank to member banks that borrow money. Before the creation of the monetary policy committee in 2004, CBG used the treasury bills discount rates as the policy rate. But since 2004, the Bank shifted to the use of rediscount rate as its policy rate. The decision for the change was that rediscount rate provides a better signalling mechanism about policy stance.

CBG sets a benchmark reference rate that is used to signal its target for reserve money. It is called the policy rate. The policy rate is the benchmark rate used for overnight deposit and lender of last resort credit tradings. CBG assumes this rate is

suitable to maintain price stability while safeguarding an effective payment system. Notwithstanding, commercial banks can decide on their own interest rates when trading with one another.

The rediscount rate was 34 percent at the beginning of 2004 but closed the year at 31 percent. It was further reduced to 29 percent at the beginning of 2005, 19 percent by the end of the year and to14.0 percent in 2006, reflecting deceleration in inflationary pressures.

Due to the build-up in inflationary pressures arising from developments in the global energy and food prices, the rate was increased to 15 percent 2007. But it was again condensed to 14 percent in 2011, and further to 12 percent by the end of 2012.

3.5 Foreign exchange developments and Interventions

Central Banks at times intervene in the Foreign Exchange (FOREX) market by purchasing and selling foreign exchange to preserve the exchange rate, attain the anticipated level of international reserves to anchor the domestic currency , pay for imports and meet debt service commitments. Foreign exchange intervention also influences liquidity for the banking system and stance of monetary policy.

In addition to the monetary policy tools mentioned above, CBG also uses foreign exchange intervention in the conduct of its monetary policy. It intervenes in the domestic FOREX market to support OMOs and also aims to stabilize the exchange rate as part of the objectives of its monetary policy.

The exchange rate regime in the Gambia has gone through some transformations. Initially, the dalasi was pegged to the pound sterling at a rate of GMD5 /£1. Coming January 20, 1986, an interbank market for foreign exchange was initiated after which the exchange rate has been determined by market forces. With effective from June 30, 2002, the IMF reclassified the country’s exchange rate arrangement from independently floating to a managed float with no predetermined path.

The exchange rate has been varying remarkably with against major currencies traded in the exchange rate market. Sriram (2009) stated that the exchange rate was relatively stable in 1988 towards 1999 but it depreciated rapidly between 2000 and 2003 due to lax fiscal and monetary policies. He specified that international reserves

that had been falling since 2001 added to accommodating monetary policy, and fired a rapid depreciation of the dalasi by 55 percent in nominal effective terms.

Nonetheless, between 2004 and 2005, the dalasi has been appreciating in response to prudent macroeconomic policies. In 2004, the CBG bought and sold foreign exchange amounting to D1.2 billion and D15.8million, as compared to D552.99 million and D396.29 million respectively in 2003. The volume of transactions remained high, increasing by 22.2 percent in 2005. During these periods, the Dalasi continued to appreciate against all major international currencies which revealed strong macroeconomic fundamentals and increased foreign inflows.

In 2006, CBG intervened in the foreign exchange market to buy and sell foreign exchange in order to achieve the desired level of international reserves to anchor the domestic currency, pay for imports and meet debt service commitments.

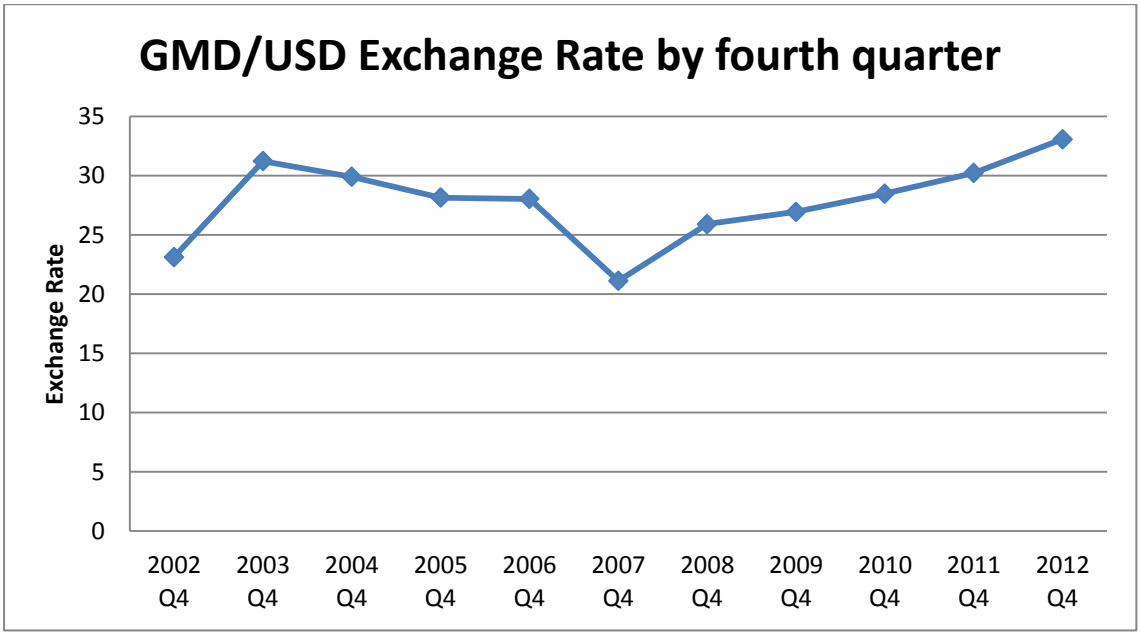
By the end of 2008, the Dalasi once again depreciated against all the major foreign currencies (USD by 17.8 percent, the CFA by 1.7 percent and the Euro by 8.5 percent.) traded in the inter-bank foreign exchange market with the exclusion of the Pound Sterling to which it appreciated by 9.7 percent.

In 2009, the Dalasi further depreciated against all the major international currencies traded in the inter-bank market apart from the Swedish Kroner. It depreciated by 7.2 percent against the Great Britain Pound compared to an appreciation of 9.7 percent in 2008 and only appreciated against the Swedish Kroner by 8.3 percent by the end of the year. According to the CBG, this was largely due to decreased supply of FOREX on account of the global economic recession, which reduced tourism revenues and FDI inflows.

In nominal effective exchange rate terms, the Dalasi deteriorated by 6.5 percent, higher than the 1.9 percent in 2010. It further depreciated in 2013 against all major international currencies traded in the foreign exchange market by 15.1 percent compared to 13.5 percent and 7.3 percent in 2012 and 2011 respectively. The depreciation as reported by the CBG was partly attributed to reduced foreign exchange receipts, combined with strong demand owing in part to the high level of liquidity in the economy.

Figure 3.2 below demonstrates the fluctuation of the Dalasi per US dollar exchange rate for the year in year fourth quarter. Quarter four is selected because the tourism season begins this quarter and foreign currency is mostly traded during the season. The dalasi gained some strengthen in 2007 after a prominent depreciation in 2003 but started depreciating again from the following year.

Figure 3.2: The exchange rate movements in The Gambia between 2002 and 2012



Source: Author, based on data from CBG

Foreign exchange interventions by the CBG in principle should be limited to smoothing operations but it seems this is not the case some times. But the recent IMF article IV report highlighted that between October 2012 and August 2013, the Office of the President intervened with series of directives (October 2012, June 2013, and in July 2013) to enforce exchange rates appreciation against the market rate in the country. The same report indicated that when the directives were lifted in the first two cases, the dalasi depreciated severely amid signs of capital flight and reduction in remittances.

Despite the fact that price and exchange rate stability are mainly focused on by the bank among its primary objectives, CBG is facing challenges to independently stabilize the Dalasi. There were instants also when its liquidity management actions yielded little results such as the inflation situation between 2003 and 2004. These scenarios indicate the need to identify sources of price and exchange rate instability,

in order to design appropriate monetary policy instruments that could respond to similar shocks, keep the national currency stable and maintain price stability.

CHAPTER 4: DATA DESCRIPTION AND ECONOMETRIC MODEL

4.1 Definition of Variables

This section describes the variables used in the study. The data set comprises of quarterly time series data of macroeconomic variables including exchange rate, GDP, CPI, money supply and interest rate. The variables are all domestic except the world price of rice which is used later on in the study. The data on CPI and GDP are obtained from the Gambia Bureau of Statistics whereas the data on exchange rate, interest rate and money supply are obtained from CBG.

4.1.1 Exchange Rate

The nominal exchange rate can be defined as the number of units of the domestic currency in our case the Dalasi that can buy a unit of a given foreign currency. An increase in the exchange rate is characterized as nominal depreciation while a decrease in this variable is termed nominal appreciation of the Dalasi. To avoid biasness, exchange rate of the Gambia is often measured in terms of SDR instead if the conventional US dollar yardstick. This method is also used to provide common ground for comparison with the exchange rate of trading partners. The exchange rate variable carries profound information that reacts to almost all other variables in the system. The US Dollar remained the most actively traded currency in the inter-bank foreign exchange market. Thus monthly GMD/USD exchange rates are used and converted into quarterly estimates for the purpose of this paper.

4.1.2 GDP

GDP of the Gambia (constant prices) is one of the domestic variables whose stabilization is one of the objectives of the monetary policy. It is also a key variable that describes the economic developments, which must be present in a VAR model; if it is supposed to capture the economic dynamics well. As such, we are interested in how the variable affects fluctuations of the exchange rate.

The annual estimates of GDP and the activity components are compiled using the production approach. The variable is estimated by extrapolating the benchmark estimates of production/output using the value indices (for current price estimates) and quantity indices (for constant price estimates). The data for this study is from 1998Q1 to 2012Q4 and it corresponds to two series of GDP (one is the series from 1998-2004 with the old benchmark/base year period of 1976/77 prices and the other series is from 2004 to 2012 with the new base year of 2004).

The Gambia Bureau of Statistics (GBoS) conducted an economic census in 2004/2005 that served as a new benchmark to compile the GDP . As a result, the old GDP series of 1976/77 benchmark (SNA68) is now replaced by the base of 2004 which is in line with the SNA93

For the purpose of this study, we attain the quarterly series of GDP from given annual totals by applying a method of interpolation.

4.1.3 CPI

The CPI is an indicator that measures the average change over time in the prices paid by the consumers for the basket of consumer goods and services. It accounts for the inflation experienced by consumers in their day-to- day expenses. The level of variation of general prices in the Gambia is represented here by the percentage change in the quarterly CPI. As such, stability in this variable is a primary objective of the central bank of the Gambia. The index used is based on all items (food and nonfood). Consequently, the index is an important tool in the design and conduct of both the monetary and fiscal policies.

An Integrated Household Survey (IHS) was conducted in 2003/2004 with the main aim of rebasing the Consumer Price Index (CPI). Consequently, the old CPI series of 1974 base was changed to 2004 base and there was a huge drop in the index in the third quarter of 2004 when the change was put into effect. The 1974 base was an urban CPI, covering only four urban markets whereas the new series (2004 based) which started from august 2004 is a national CPI. The two baskets are totally different resulting in a huge difference in the index.

4.1.4 Broad Money Supply

Broad money supply is a measure of the amount of money within a specific economy available for purchasing goods or services. For this paper the broad definition of money supply (M2) is adopted which includes currency in circulation, demand deposits, quasi-money and foreign currency deposits. Most central banks are responsible for maintaining price stability and in many cases, money supply is actually an endogenous variable. Similarly, CBG is responsible for controlling money supply in the economy within its monetary policy framework. Thus, it is important to evaluate the role of this variable in relation to exchange rate fluctuations. The variable is expressed in millions of Dalasi except otherwise stated.

4.1.5 Rediscount Rate

This is the rate of interest charged to member banks when they borrow from the CBG. It is frequently called the discount rate and as a policy instrument, this is a variable over which CBG has sufficient control. To attain CBG objectives, the bank uses rediscount rate to signal its monetary policy stance. It is thus useful to study its influence on exchange rate fluctuations in the Gambia.

4.2 VAR Methodology

Several methodologies such as macro model simulations and least squares analysis have been used to study sources of exchange rate fluctuations. VAR model is motivated to capture important sources of exchange rate fluctuations in this study. The VAR approach has many advantages such as exploring the multivariate model and identifying the importance of various shocks through variance decomposition. The VAR models are widely used in macroeconomic empirical studies since they were launched for such purposes by Sims (1980).

All the variables in a VAR are treated as endogenous and unlike empirical specifications derived from theoretical models, VAR puts no assumptions on the way the variables will affect each other. In addition, there exists many applications (such as co-integration test, impulse response analysis and variance decomposition) employed by VAR analysis that can describe the relationship among variables and their behaviours.

Below is the specification of the VAR model with five endogenous variables comprising of exchange rate, GDP, CPI, money supply and interest rate.

4.3 Model Specification

A VAR model describes the evolution of a set of k endogenous variables over the same sample period ($t = 1... T$) as a linear function of only their past values. The variables are collected in a $k \times 1$ vector y_t, which has as the i^{th} element, $y_{i,t}$, the time t observation of the i^{th} variable.

The variables used in this study are represented as:

EX= Exchange rate

CPI= Consumer Price Index

MS= Money Supply

i=Interest Rate

Y=Gross Domestic Product (GDP)

The VAR process is expressed as

$\boldsymbol{Y_t = \mu + \sum_{i=1}^{P} \Phi_i Y_{t-i} + u_t,}$ t=1, 2……T …… (4.1)

$P \geq 1 \; and \; 1 \leq i \leq P \qquad u_t = R\varepsilon_t$

where

$Y_t = \; vectors \; are \; observable$

$\mu = vector \; of \; intercept \; term$

$\Phi_i = vector \; of \; coefficient$

$\varepsilon_t = vector \; of \; error \; term$

$R = unknown \; fixed \; non \; singular \; matrix$

$\varepsilon_t \sim$ iid N $(0, \mathrm{I})$, t = 1,2,…,T

4.3.1 Co Integration Test and Vector Error Correction Model (VECM)

The problem of spurious regression arises if nonstationary, I (1) or trending series are regressed on each other. With regards to I(1) type, a spurious relationship results because the series incline to show local trends (even without drifts) which tend to move together for relative long periods. In the case of trending series, it is due to the trend that grows over time dictating the series instead to economic reasons.

For Johansen's method of co integration which is used in this paper, Engle and Granger (1987) first established the approach with the concept of maximum likelihood estimation. The procedure examines the relationship between I (1) time series variables and concludes that when two or more series all have a unit root but

their linear combination is stationary or I(0), then such time series are co-integrated (there exist long run relationship among the variables).

Since the results of the unit root test for all the variables are non-stationary at level of each series (table 5.2 below), then the Johansen's test of co-integration is suitable to examine for co integration.

With reference to Johansen (1995), y_t follows a VAR (p) process that is fixated on the effect of the lag specification based on the test results. This process is expressed as the following:

Given a VAR (p) of I(1) y 's, we have

$$y_t = Z_1 y_{t-1} + Z_2 y_{t-2} + Z_3 y_{t-3} + \ldots . + Z_p y_{t-p} + \varepsilon_t \quad \text{.....(4.2)}$$

Where

$y_t = k \times 1 \; random \; vector$

$Z_i = k \times k \; fixed \; coefficient \; matrices$

$\varepsilon_t = \; vector \; of \; the \; error \; term$

$\varepsilon_t \sim \text{iid N}(0, \text{I})$, t = 1, 2, 3,…,T

Following Johansen (1995) again, equation (4.2) is transformed into a vector error correction model (VECM) so as to perform the Johansen's co-integration analysis. This is done by introducing an error correction term (Vy_{t-1}) into the equation as below.

$$\Delta y_t = V_1 \Delta y_{t-1} + V_2 \Delta y_{t-2} + \; \ldots \ldots \ldots . + V_{p-1} \Delta y_{t-p+1} + V y_{t-1} + \mu_t \quad \text{..... (4.3)}$$

$V_i \; = -(Z_1 + Z_2 + \; \ldots \ldots \ldots \ldots + Z_p)$

$V = Z_1 + Z_2 + \; \ldots \ldots \ldots \ldots + Z_p - I_n = -Z(1)$

Equation (4.3) above is referred to as the VECM and from it, $y_t \sim CI(1)$ and

$V_i = k \times k \; fixed \; coefficient \; matrices$

$V = k \times k\ fixed\ cointergration\ matrices$

$\mu_t = k \times 1\ white\ noise\ process$

If V = 0, then there is no co-integration. Non-stationary or I(1) type disappears by taking differences. Δ serves as the first-difference operative. If V has full rank, k as described above, then the y's cannot be I(1) but are stationary or I (0). With co-integrated equations or long run equilibrium, the error correction term accordingly executes the test. There is a correction to the equilibrium or long term relation described by the co-integrating relation in case the macro economic variable diverges from this long run equilibrium and attains a state of disequilibrium. When this happens, the "**error**" will be adjusted over time by the error correction term to regulate the Δy_t, so that the y's move together in the correct direction and get the system back to "**equilibrium**".

4.3.2 Impulse Response Function

In macroeconomics, impulse response functions are often modelled in a vector autoregressive (VAR) environment. They describe the reaction of endogenous macroeconomic variables such as output, employment and prices at the time of the shock and in the future. With the VAR model, a shock to any particular variable is also transmitted dynamically to all the other endogenous variables via its lag structure. An impulse response function traces the effect of a one-time shock to the present and also future values of an endogenous variable.

From the VAR process expressed in equation (4.1) above, the set of $\boldsymbol{\Phi_i}$ is referred to as the impulse response function. It's plots express the behaviour of time series in response to the various shocks both at the time of the shock and in the future (Enders, 2004). In this paper, the impulse response analysis presents the behaviour of exchange rate to shocks in output, inflation, interest rate and money supply.

4.3.3 Variance Decomposition

In multivariate time series analysis, variance decomposition is an application that helps in the interpretation of a VAR model after it has been fixed. The variance decomposition defines how much of variation in the endogenous

variable can be explained by a shock to the other variables, forecasted for the future. It splits this variation in a selected endogenous variable into the component shocks of the other variables including its own. In addition to these properties, the variance decomposition analysis in this paper will also help to explain the impact of shocks in macroeconomic variables to exchange rate fluctuations.

CHAPTER 5: DATA ANALYSIS and DISCUSSION OF RESULTS

This chapter describes properties of the variables and empirical results of the study. The findings are those generated from the VAR model, the impulse response function and the forecast variance decomposition analyses.

5.1 Descriptive Statistics

For better interpretation of the results and to have the variables in the same order of magnitude, we made appropriate transformations to the money supply variable. The original unit of the variable was millions of dalasi but it is converted into billions to bear the same unit with the GDP variable. The rest of the variables remained unchanged.

Table 5.1: Summary Statistics, using the observations 1998:1 - 2012:4

Variable	EX	Y	CPI	MS	*i*
Mean	23.28004	15599360	98.9615	6.734274	18.41667
Standard Error	0.937635	325731.4	3.357896	0.598174	0.812523
Median	26.86244	15663615	103.505	5.91145	15
Standard Deviation	7.262888	2523104	26.01015	4.633434	6.293773
Sample Variance	52.74954	6.37E+12	676.528	21.46871	39.61158
Kurtosis	-1.11908	-1.01075	-1.35238	-1.0131	1.445805
Skewness	-0.61932	0.02839	-0.05997	0.501273	1.679914
Range	22.73575	8760555	81.07	14.73176	20
Minimum	10.5379	11134779	61.63	1.17019	14
Maximum	33.27365	19895334	142.7	15.90195	34
Sum	1396.803	9.36E+08	5937.69	404.0564	1105
Count	60	60	60	60	60

Presented in table 5.1 is the summary of the descriptive statistics of the variables used in the study. Overall, the real GDP ranged from 11 billion to 20 billion. The absolute CPI index also ranged from 62 to 143 with the mean index close to 100. On average, the exchange rate was 23GMD/ US$. It is useful to mention at this point

that both the CPI index and exchange rate were volatile during the sample period as indicated by their standard deviations. The average money supply was about 7 billion and both the median and modal rediscount rate was 15 percent.

5.2 Unit Root Test

Unit root is a feature of processes that develop through time and can cause problems in statistical inference of time series models. Therefore, in order to analyse the trend of the data across time, we need to check for the stationary of the variables for convenience in the analysis and interpretation of the results. To find better distribution, all variables are expressed in logarithms except the rediscount rate. There are several ways to perform unit root test. In this thesis, I used the Augmented Dickey Fuller (ADF) unit root test to examine stationary of the data together with the time series plot (the ACF and the PACF can be seen in Appendix I). The convention of rejecting the null hypothesis (H_0=non-stationary) when the p-value is less than the significance level [6] is followed for the unit root test results.

Table 5.2 below presents the results of the unit root test. All the variables are non-stationary or I (0) at levels. Henceforth, I transformed the variables into their first difference in order to achieve stationary. It can be noticed from the table that with the transformed variables stationary or I (1) is achieved, as the p-values are less than the referred significance level. It is important to mention that the unit root tests were performed with a constant term included. However, alternative specifications including both a constant and trend also led to similar conclusions.

Table 5.2: Unit Root test results of the variables (p-values)

Variable	Asymptotic p-values	
	levels	**First difference**
l_CPI	0.7474	2.206e-006
l_EX	0.3404	1.347e-005
l_Y	0.6033	0.002779
l_MS	0.4658	5.328e-014
i	0.5258	0.02936

[6] 5 percent significance level is considered for the test results

5.3 VAR lag selection

For VAR analysis with the Choleski decomposition of shocks, ordering of the variables and optimal choice of lags are important before moving onto the model building and impulse response analysis. The vector of the endogenous variables Y_t can be defined as;

$$Y_t = \begin{bmatrix} Exchange\ rate \\ GDP \\ CPI \\ Money\ Supply \\ Rediscount\ rate \end{bmatrix}$$

The variables are ordered with the main policy variable at the bottom. As discussed above, while the main policy variable of interest is the rediscount rate, we also examine the effects of other policy variables (money supply, CPI and output) on exchange rate. Selection of the appropriate lag is vital because too few lags will result to the model not picking up the actual data process well. This means that the regression residuals will not act as white noise and hence the model will not be correctly estimated. Also, too many lags can lead to lost degrees of freedom and also decrease the power of the test to accept or reject the null hypothesis (Enders, 2004). Based on this, we undertake the lag selection in the first step; that is how many lags should be used in the system of equations.

Table 5.3: Results of the VAR lag selection

lags	loglik	p(LR)	AIC	BIC	HQC
1		466.99465	-15.606952	-14.521942*	-15.186296
2	511.68881	0.00000	-16.310315*	-14.321130	-5.539112*
3	532.82636	0.01679	-16.172370	-13.279010	-15.050620
4	555.91625	0.00612	-16.104152	-12.306617	-14.631856

NB: The asterisks indicate the best (that is, minimized) values of the respective information criteria. AIC = Akaike criterion, BIC = Schwarz Bayesian criterion and HQC = Hannan-Quinn criterion

The appropriate lag length of the VAR is determined by using the best values of the respective information criteria. From the results presented in table 5.3 above, both the Akaike Information Criterion (AIC) and the Hannan-Quinn criterion (HQC) indicate that VAR of lag 2 is optimal. Therefore, we shall use 2 lags in our model estimation in this study.

5.4 Co Integration Test and Vector Error Correction Model (VECM)

After selecting the optimal lag, we perform the Johansen test of co integration before developing the VECM. The precondition for this test is that all the variables should be non-stationary at levels but when converted into their first difference, they should become stationary (integrated of same order). When this condition is fulfilled by the dataset, then we can run the Johansen test of co integration. From the unit root test results in table 5.2 above, we confirm that our dataset can be used to perform the Johansen test of co integration. Based on this, we investigated the long run relationship between the macroeconomic variables by determining the presence of co-integrating vectors in a non-stationary time series data.

Table 5.4: Results from Johansen test of co-integration

Rank	Eigenvalue	Trace test	p-value	Lmax test	p-value
0	0.61762	120.57	[0.0000]	53.834	[0.0001]
1	0.43032	66.731	[0.0029]	31.510	[0.0372]
2	0.36604	35.221	[0.0476]	25.523	[0.0315]
3	0.15865	9.6986	[0.5173]	9.6741	[0.4355]
4	0.00043765	0.024514	[0.8756]	0.024514	[0.8756]

In the Johansen test of co-integration, there are two types of statistics (trace and L max) that we rely on in rejecting or accepting the null hypotheses. As can be seen from table 5.4, we can reject the null hypothesis of no co-integration among the variables. The results[7] propose that these variables are non-stationary at levels but co-integrated. It means that the variables have long run association or have

[7] Unrestricted trend and constant were assumed while running the test

equilibrium relation. Both the trace and L max tests point out that the variables have 3 co-integrating equations at 5 percent significance level. This indicates that co-integration is established and we can now proceed with the estimation of the vector error correction model.

Although the test of co-integration confirms the existence of long run relationship between the economic variables, it is possible for these variables to show disequilibrium especially in the short run. The error correction term in the VECM rectifies this disequilibrium in the subsequent periods. Therefore, it could be right to say that the role of an error correction term is to blend the short run and long run conducts. Recalling from equation (4.3), V is the coefficient vector of an error correction term in our model.

Table 5.5: Results of the estimated Vector Error Correction Model[8]

Error Correction	Δ EX	Δ GDP	Δ CPI	Δ MS	Δ i
EC 1	-0.128545 (0.0088 ***)	0.00159701 (0.7696)	-0.0288168 (0.0180 **)	0.109218 (0.0297 **)	-2.04521 (0.2106)
EC 2	0.257934 (0.4846)	-0.155426 (0.0006 ***)	-0.213826 (0.0238 **)	0.921719 (0.0190 **)	-15.8178 (0.2136)
EC 3	-0.511951 (0.1817)	-0.0727804 (0.1012)	-0.348204 (0.0006 ***)	1.26840 (0.0022 ***)	-14.9012 (0.2553)

Notes:

1) Figures in the brackets are the p-values.
2) Both*** and ** refer to significant at 5percent level

The V in our VECM represents the one period lagged value estimated error of the co-integrating regression. From table 5.5 above, the estimations of the short run dynamic show that the coefficients of the error correction (EC) for all the variables except interest rate are significant in our model. Exchange rate and output are significant for the first and second equations respectively whereas, CPI is significant for all the three co-integrated models. The coefficient for money supply is significantly positive which indicates that there is a divergence from the equilibrium. In other words, we can say that these variables achieve the error correction

[8] We assumed unrestricted trend and constant in the time series.

mechanism in our model. It implies that the time series data for such variables will indeed attain convergence or long run causality when disequilibrium exhibits.

The absolute values of the error correction term explain the speed of adjustment of any disequilibrium towards long run equilibrium state. We can see from the table 5.5 that interest rate correct fastest towards long run equilibrium followed by money supply and the slowest is GPD.

We investigated ARCH effect and serial autocorrelation in our model to confirm its efficiency. According to the results from the tests, According to the results from the tests, there is neither an ARCH effect nor serial autocorrelation in our model. These findings point out that our model is efficient and we can rely on it.

5.5 Impulse Response Analysis

The impulse response functions of a VAR analyse the dynamic effects on the system when the model receives a shock. Based on the results of the VECM, we examine the effect of a shock from the macro economic variables on the expected future values of our exchange rate variable. In addition to this, we inspect the effect of exchange rate on the various other variables, too. Presented in figure 5.1a below are the response of exchange rate to shock in itself, output, inflation, money supply and interest rate (left panels) and response of the various other variables to shock from exchange rate (right panels).

The reaction of exchange rate to its own shock is quite persistent. In fact, it increases in the first three periods, and then a continual drop is observed towards quarter 20.

There is an indication, albeit statistically insignificant, that a unit volatility shock from output has a temporary lagged positive effect on the exchange rate. The response is close to zero for the first year after which the exchange rate starts to depreciate remarkably to about 3 percent in the 10^{th} quarter. On the other hand, the response of output to a depreciation shock in exchange rate is mostly positive, although insignificant, and it starts to drop after quarter 13 through the end. The magnitude is quite strong (4 %) in the 6^{th} quarter.

Innovations in the price level initially lead to a statistically insignificant and quantitatively small depreciation of the exchange rate, but the exchange rate then starts to appreciate insignificantly after 2 years. On the other hand, there is a

statistically significant evidence of a positive effect on the price level in reaction to a depreciation shock in the exchange rate. Moreover, this response of the price level is steady, as one would expect.

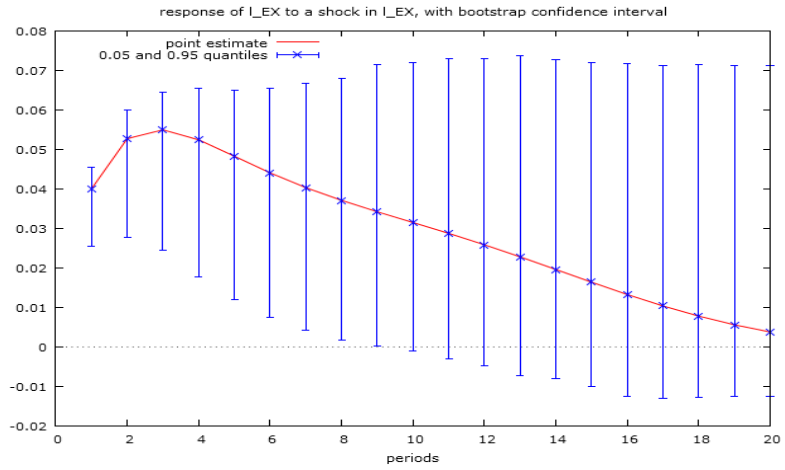
To continue, our results of the impulse response analysis show that the exchange rate displays a temporary and insignificant positive response to the money supply. On the other hand, the money supply response remains positive, strong, significant and persistent after a shock to the exchange rate.

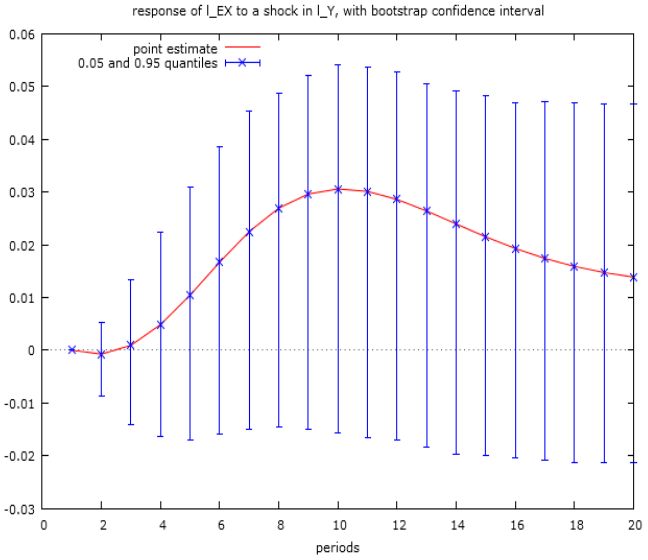
Finally, with regards to the interest rate, exchange rate exhibits both appreciation and depreciation in response to a shock in interest rate for the 5 years. Our findings indicate that there is initial insignificant appreciation of the dalasi in the first 6 months. Then it starts to depreciate up to quarter 10 after which it begins to appreciate again continually with an increasing trend of 2 percent in the last quarter.

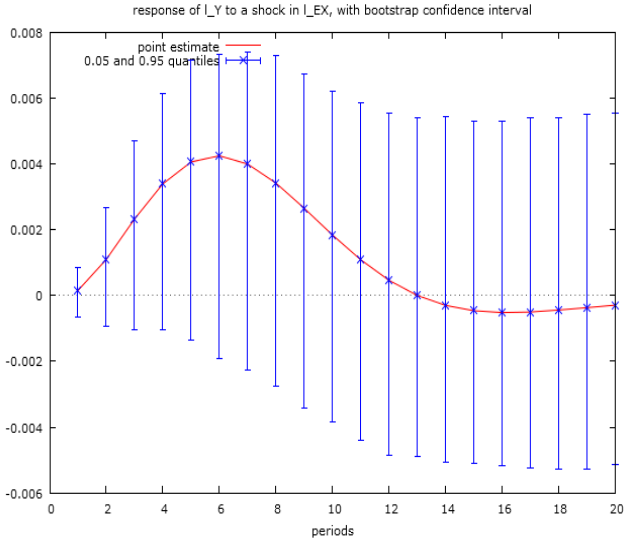
To check for the robustness of our results, the model has been re estimated with the world price of rice added and set as an exogenous variable. This is because rice is the leading imported commodity in the country and it also serves as the staple food for the population. Therefore, it is an important variable when studying the behaviour of macro economic variables for the country. The impulse response analysis from the new estimation (see figure 5.1b below) presents similar results as our original model. However, the relationships between CPI, money supply and interest rate with exchange rate improved slightly as compared to the previous estimation.

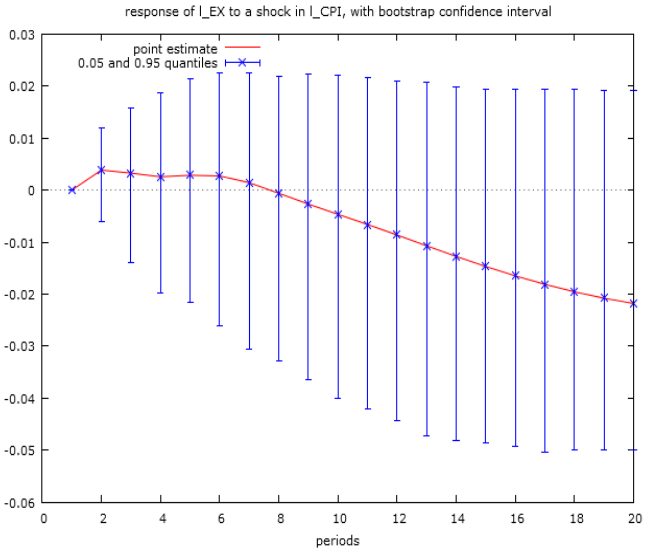
An upward shock in both CPI and money supply result to depreciation of the exchange rate throughout the forecast period, as one could expect. Exchange rate displayed a depreciating response to a shock from the interest rate all the way through as well.

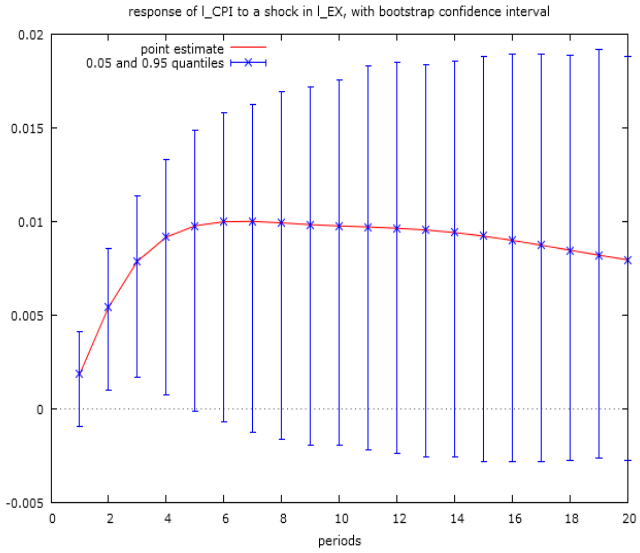
Figure 5.1 a: Impulse Response to Cholesky One S.D. Innovations

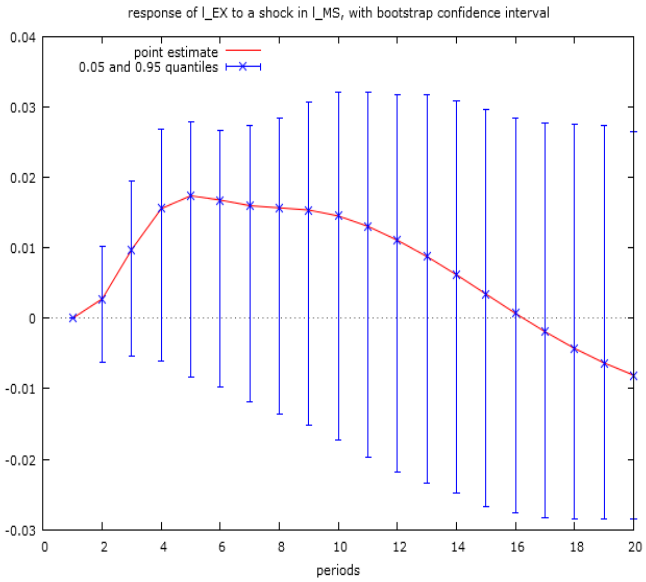


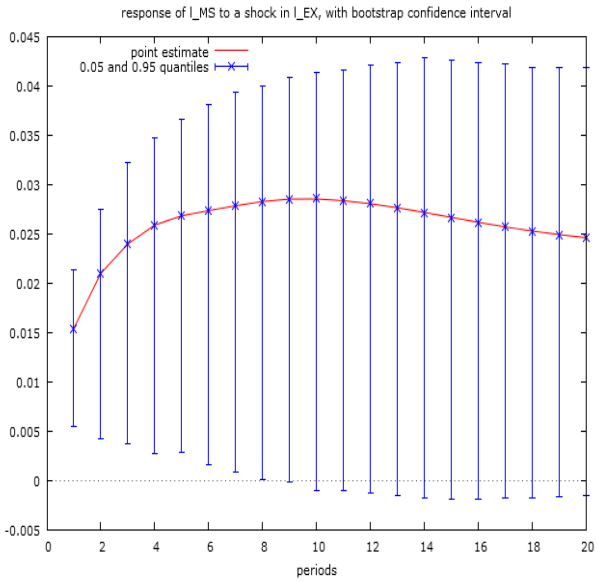


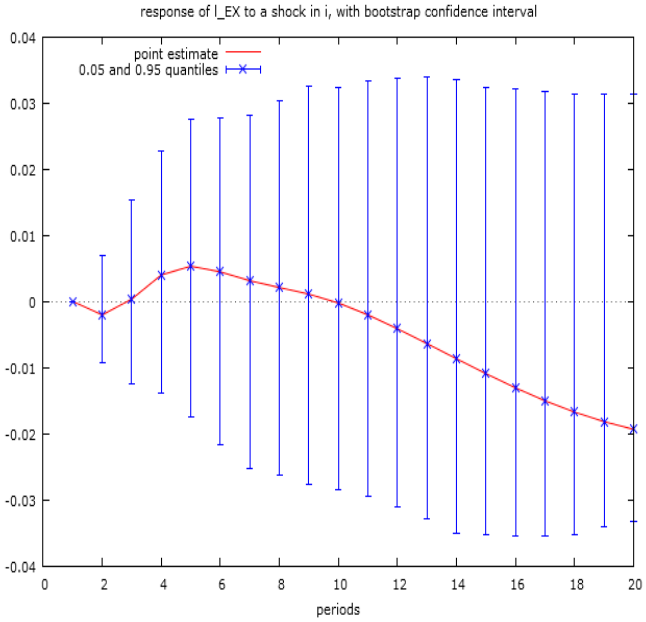







response of l_EX to a shock in l_MS, with bootstrap confidence interval
point estimate
0.05 and 0.95 quantiles
periods


response of l_MS to a shock in l_EX, with bootstrap confidence interval
point estimate
0.05 and 0.95 quantiles
periods


response of l_EX to a shock in i, with bootstrap confidence interval
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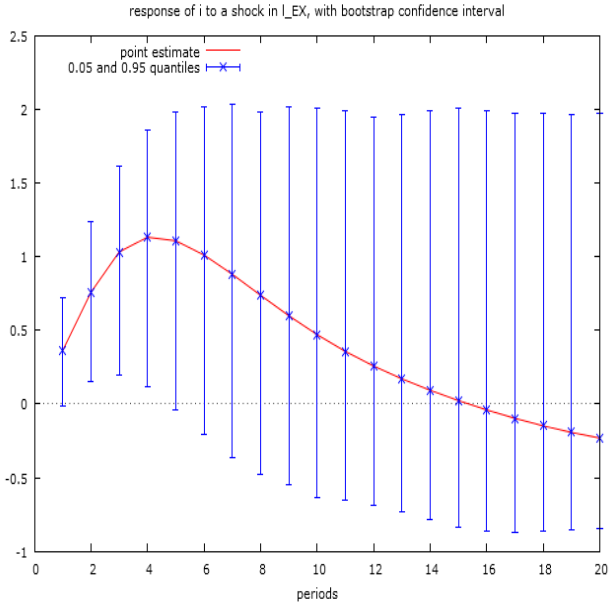
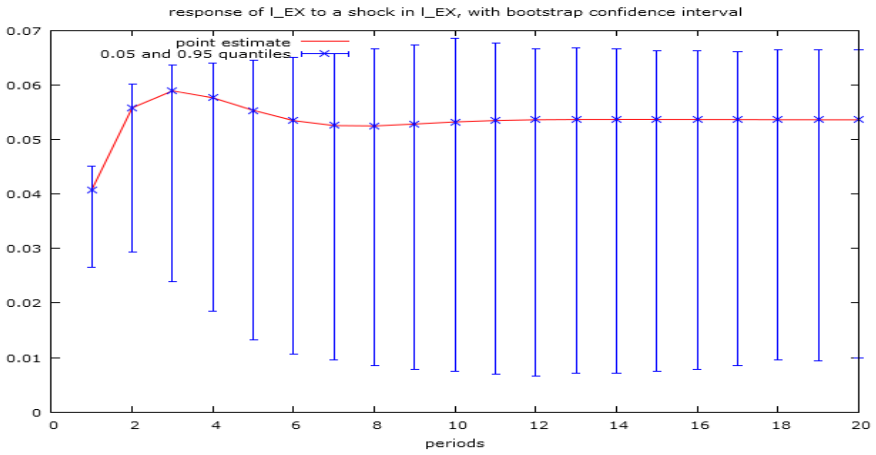
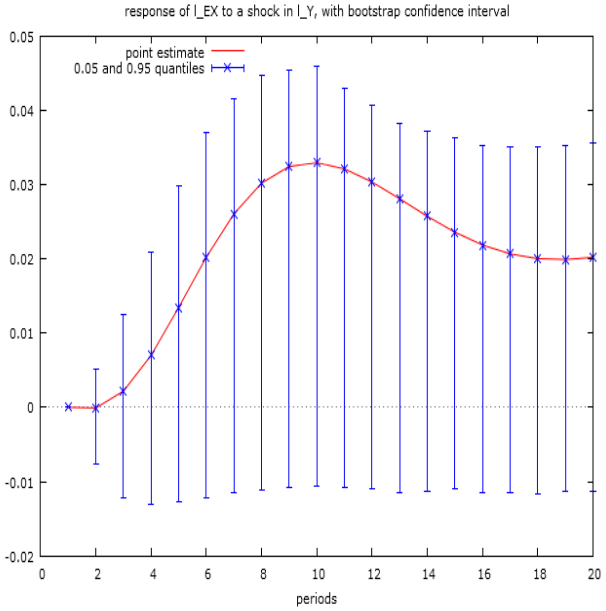
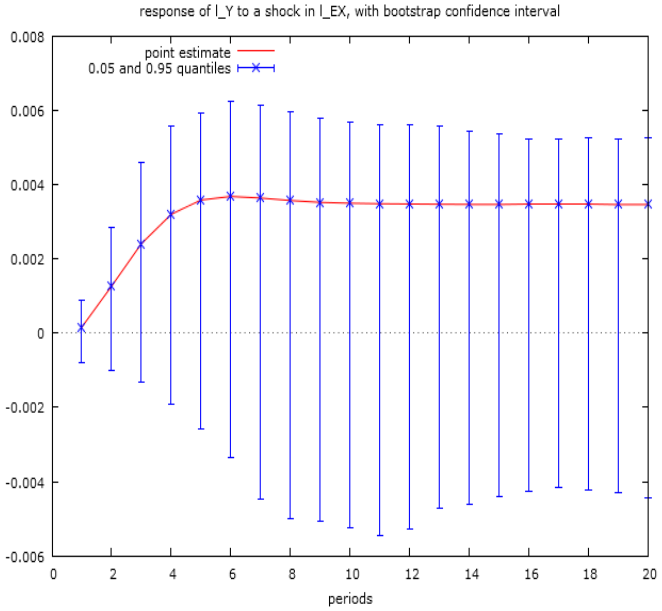
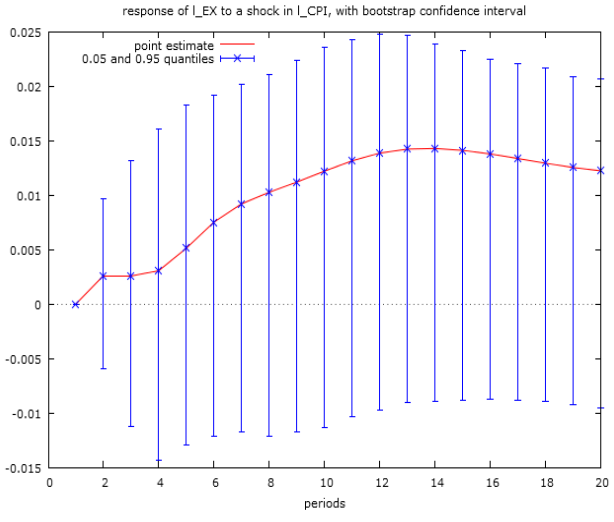

response of i to a shock in l_EX, with bootstrap confidence interval
point estimate
0.05 and 0.95 quantiles
periods

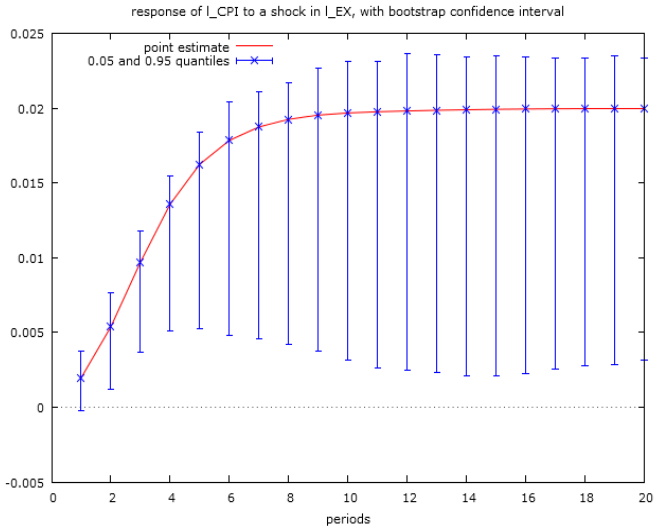
Figure 5.1 b Impulse Response to Cholesky One S.D. Innovations (Rice as exogenous)

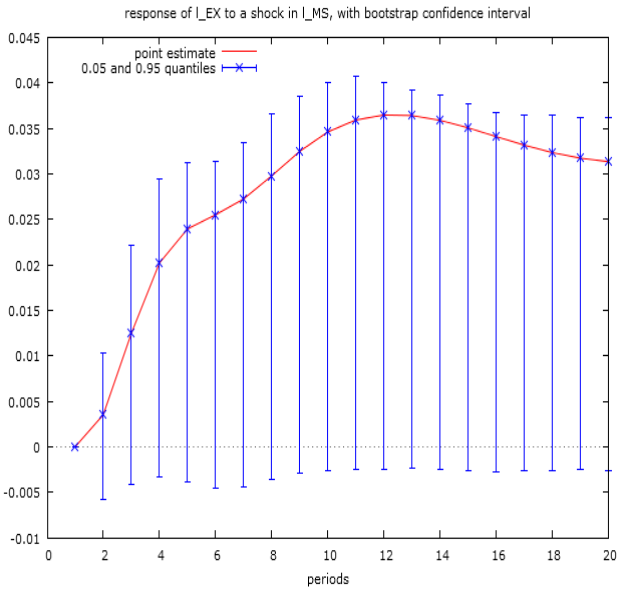


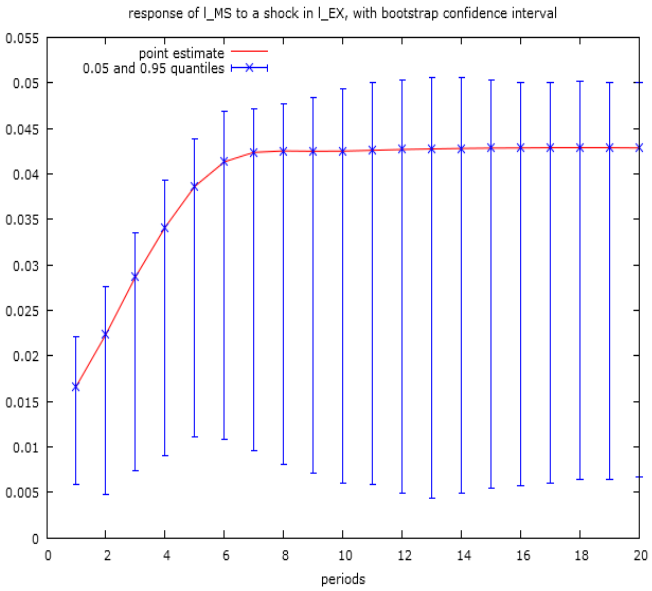


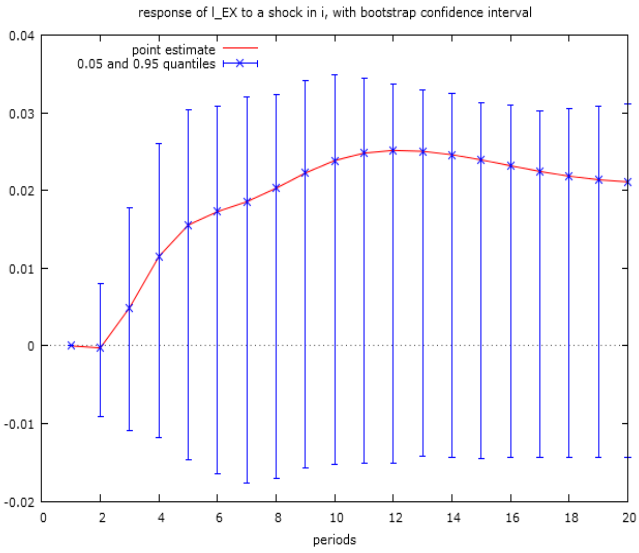


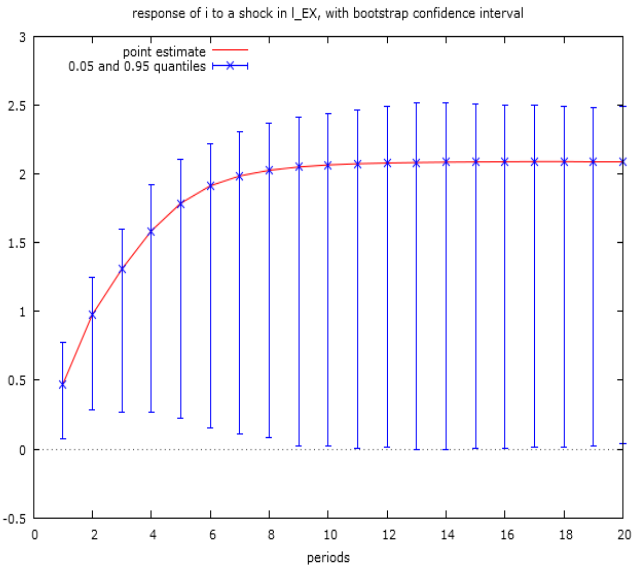












5.6 Variance Decomposition Analysis

While impulse response analysis is suitable in gauging the signs and magnitudes of responses to a shock from macroeconomic variables, the forecast variance decompositions analysis helps to determine the relative importance or contribution of shocks from different variables to a particular variable's fluctuations.

Result of the variance decomposition analysis for our exchange rate variable is presented in appendix II. It supports the results implied by impulse response analysis.

The analysis reveals that the largest share of shock to exchange rate variability comes from its own innovations. In all time horizons, it accounts for more than 60 percent of the variation in exchange rate with a range from 100 percent in the first

quarter to 60 percent in the last forecast period. GDP is the second main contributor to the exchange rate volatility. It has an increasing trend with a maximum of approximately 22 percent in the fourth year. The developments remain in this fashion until the end of the forecast period.

Interest rate has almost the least impact on exchange rate fluctuations in each period with a maximum of 2 percent in quarter 20. The contribution of money supply has not been steady. Although not much, but it has been rising until after quarter 15 when it starts to decrease. As it drops towards the end of the forecast period, it has nearly similar impact on exchange rate variability as CPI.

Like the impulse response analysis, the forecast of variance decomposition for exchange rate with consideration of rice as an exogenous variable is not much different (see appendix III). Exchange rate itself continues to be the leading contributor to its variability with a similar importance. However, money supply toppled GDP and became the second largest contributor with a maximum of 18 percent in the fourth year. The share of inflation to exchange rate variability is now the smallest in each period (maximum of 2% starting from quarter 14) comparable to interest rate in the earlier forecast.

5.7 Summary of Findings

There is evidence that exchange rate responds to shocks in the system from key macroeconomic variables, including, GDP, CPI, money supply, interest rate and its own shock. Also, the results indicate that the impact of shock from some of these variables on exchange rate volatility takes very long time to return to equilibrium (beyond 20 quarters).

It is clear from the findings that output characterized as GDP here, has a positive relationship with exchange rate in the Gambia. Although the Balassa- Samuelson effect[9] established a negative relationship between the two variables, there are similar findings to my results for developing nations. For instance, Rodrik (2008) used China, India, South Korea, Taiwan, Uganda, and Tanzania to provide evidence in his work. According to him, undervaluation (high exchange rate) stimulates the growth of an economy and as such, there is a positive relationship between exchange rate and the GDP growth rate. He further claimed that this is factual mainly for developing countries, proposing that tradable goods suffer disproportionately from the distortions that keep poor countries from converging.

[9] See Balassa (1964) and Samuelson (1964)

Tarawalie (2010) used quarterly data and employed recent econometric techniques, to investigate the relationship between the effective exchange rate and economic growth in Sierra Leone. The empirical results from his analysis suggest that the real effective exchange rate correlates positively with economic growth, with a statistically significant coefficient.

More recently, Attah-Obeng et.al (2013) strongly concluded that there is a positive relationship between GDP growth rate and exchange rate in Ghana and also related their findings to the theory that undervaluation (high exchange rate) stimulates economic growth in the short run.

In addition, our results indicate that the domestic currency typically depreciates in response to shocks from CPI and money supply. Also, both CPI and money supply increase in reaction to a depreciation shock in the exchange rate. This conforms to our hypothesis that both variables are positively related with exchange rate.

The findings of the study concur to the fact that the dalasi has not been stable against the US dollar during the study period.

Both analyses support the notion that these macro-economic variables have some degree of effect in the variability of exchange rate in the country. Focusing on inflation whose stability is the main primary objective of the monetary policy and the rediscount rate which serves as the one of the key policy instruments, we further summarize their outcomes from both analyses.

The Impulse response analysis provide evidence that exchange rate depreciates in response to a shock from interest rate. Also, there is indication of a rise is interest rate in reaction to a shock in exchange rate. However, the results from the variance decomposition analysis show that interest rate has little influence on the variability in exchange rate.

Although CPI contributes marginally to the exchange rate variability when compared to other variables from the results of the variance decomposition, the effect of a shock to the price level lead to a deprecation of the exchange rate from the impulse response analysis. On the other hand, a depreciation shock to the exchange rate results in a higher price level.

Combining the results from both analysis, we can say that inflation and interest rate although may have little contribution to fluctuations in the exchange rate but they can explain variability of the exchange rate volatility in the Gambia.

CHAPTER 6: EXCHANGE RATE OR INFLATION TARGETING FOR THE GAMBIA

The aim of this chapter is to suggest an alternative policy regime that can probably minimise or end the bothering and long-time exchange rate variability that the Gambia experiences. To recall, the Gambia currently adheres to monetary targeting regime. The considerations that follow are supported by the existing literature and partly also by the results of the empirical analysis in the previous section, and are not based on a general evaluation of the current regime.

6.1 Exchange rate Targeting

The policy of fixed exchange rate is based on keeping a fixed rate against a foreign currency. The degree of fixed exchange rate differs and is based on its rigidity with that of the anchor country. Under a system of fiat fixed rates, the monetary authority announces a fixed exchange rate but does not actively take part in the trading of the currency to maintain the rate. Rather, the rate is imposed by measures such as import or export licenses and capital controls. As such, there is a black market for exchange rate where the currency trades at its unofficial or market rate.

Unlike with the fiat fixed rate system, the monetary authority is actively involved in foreign exchange trading under a standard system of fixed exchange rate. This is done on a daily basis to achieve the target exchange rate which may be a fixed level or a fixed band within which the exchange rate may fluctuate. When there is variability in the exchange rate, the authority intervenes through buying or selling as required to keep the exchange rate within the band.

Under a currency board system, each unit of local currency must be backed by a unit of foreign currency. By this, the local monetary base surely does not inflate without being supported by the foreign currency. Also, the fear of run by those wishing to convert the domestic currency to the anchor currency is significantly reduced.

Mishkin and Savastano (2002) pointed out that full dollarization is a hard peg regime which encompasses abolishing entirely the domestic currency and switching it with the U.S. dollar. According to them, this arrangement signifies a stronger pledge to monetary stability when compared to a currency board because it makes it so hard for the government to regain governance over monetary policy and/or change the value of the domestic currency which does not exist.

As indicated by Petursson (2000), the belief that countries are gradually being obliged to choose between strict (currency board or adoption of another currency) and flexible (using different nominal anchor) exchange rate regimes still active. He reported that this development followed the currency crisis in South-East Asia and Mexico and the adaptation of a distinct currency by 11 European states which are characterized by liberalization and increase in international financial transactions. With such an environment, he added, exchange rate stability can be very difficult and this could be a risk to financial stability.

According to Edwards (2007) many emerging economies used the nominal exchange rate to lower inflation while others especially those in Latin America used the exchange rate to indirectly tax the export sector. He stated that many authors relied on credibility-based theories to reason that developing countries and those going through transition should establish hard peg regimes, possibly currency boards or dollarization. Furthermore, Edwards (2007) inclined that one of the main arguments in support of rigid exchange rate regimes was that emerging economies demonstrated a fear of floating.

Finally, it is necessary to comment that under the exchange rate targeting, monetary policy in the pegging nation must align with monetary policy in the anchor nation to maintain the exchange rate and the domestic monetary policy is dependent on that of the foreign monetary authority.

6.2 Pros and Cons of Exchange rate Targeting

At this point, it is worth mentioning some advantages and disadvantages of exchange rate regime before progressing. First as noted by Petursson (2000), fixed exchange rate smoothen currency fluctuations which reduces transaction costs and exchange rate uncertainty in international trade thereby encouraging trade. Similarly, Mishkin and Savastano (2002), mentioned that the currency risk component from domestic interest rates is abolished by hard pegs and this translates to better outlook for financial expansion, investment, and growth.

Secondly, fixed exchange rate can function as a proper mechanism for controlling inflation. In this relation, Petursson (2000) renowned that a credible fixed exchange rate policy can benefit from the credibility of the policy in the anchor nation, helping to bring inflation down to a comparable level to that pertaining in the anchor country.

On a parallel argument, Mishkin and Savastano (2002) also cited that hard pegs can deliver a nominal anchor that puts inflation under control. They clarified that this is can be achieved by fixing the prices of locally produced tradable goods to those in the anchor country, and subsequently breaching the inertial component of inflation that feeds into wages and prices of non- tradable goods which creates inflation expectations to converge to those in the anchor country.

Finally, hard pegs have the advantage of automatically adjusting the money supply. Mishkin and Savastano (2002) stated that the automatic adjustment mechanism for the money supply alleviates the time inconsistency problem of the monetary policy. They further revealed that with the hard pegs, monetary policy is simple, clear and easily understood by the public. Mishkin (1998) also pointed out this same advantage but he went ahead to specify that the automatic adjustment of the money supply forces a tightening of monetary policy when there is a tendency for the domestic currency to depreciate or a loosening of policy when there is a tendency for the domestic currency to appreciate. With such characteristics of exchange rate targeting, he asserted that monetary policy no longer has the discretion that can result in the quest of expansionary policy to attain employment gains which lead to time inconsistency.

Notwithstanding its numerous advantages, there are a number of disadvantages, too, associated with a fixed exchange rate policy. First and foremost, the pegging country losses the power over its monetary policy to the anchor nation. Petursson (2000) mentioned that a fixed exchange rate policy can condense the flow of information that needs to be transmitted to the authorities because vital information about a country's monetary stance and credibility are contained in the exchange rate. He further noted that even though exchange rate is an easy target to monitor, it results in a less transparent policy but this problem is less if the exchange rate is accepted to vary within a particular band. Mishkin and Savastano (2002) also concord to this argument. They mentioned that hard peg countries lose an instrument that may help the authorities counter the effects of certain shocks to the domestic economy.

Secondly, shocks from the anchor economy will unavoidably be reflected in the domestic economy. According to Petursson (2000), the central bank is denied the power to respond to shocks that are peculiar to the domestic economy and added that when an economic shock from the anchor country reflects in the domestic interest rates, it can lead to problems.

On a third note, which relates to currency crisis, Petursson (2000) highlighted that countries with fixed exchange rate regimes become inclined to speculation against their currencies. This he said occurs if the fixed exchange rate policy lacks credibility because there is a risk that investors will seek to get rid of that currency, forcing the central bank to buy it back on a large scale in order to defend the peg with rising domestic interest rates which can prove very expensive and trigger a domestic crisis. In the same paper, Petursson (2000) indicate that a fixed exchange rate policy can increase the probability of a financial crisis if the bulk of the domestic liabilities are of short duration or are denominated in foreign currency. According to him, such a situation is common among countries with underdeveloped financial markets or a history of high inflation. Likewise, Mishkin (1998) noted that in emerging market countries, exchange-rate targeting is likely to promote financial fragility and possibly a full-fledged financial crisis that can be highly destructive to the economy. Additionally, he said that this monetary policy regime is highly dangerous and is best avoided except in rare circumstances for emerging markets.

Finally in balancing the advantages and disadvantages of exchange rate targeting for emerging market economies, Mishkin (1998) resolved that it is far less clear that these countries lose much by giving up an independent monetary policy when they target exchange rates because of their underdeveloped political or monetary institutions that result in the inability to use discretionary monetary policy effectively. He continued by mentioning that emerging market countries may have little to gain from an independent monetary policy, but a lot to lose and hence it would be better if they adopt the monetary policy of a country like the United States through targeting exchange rates than in pursuing their own independent policy. Mishkin (1998) justified the above argument as one of the reasons why so many emerging market countries have adopted exchange-rate targeting.

6.3 Inflation Targeting

As the name bears, the target under this policy regime is to keep inflation within a desired range. Such a target is realized through periodic adjustments to the Central Bank interest rate target like the repo or the rediscount rate which is generally a short-term policy rate. The interest rate target is kept for a specific duration (between two subsequent monetary policy meetings) using OMOs. Notwithstanding, changes are made to it in response to numerous market indicators in an effort to forecast economic trends and maintain the market on track to achieve the desired inflation target.

Svensson (1995) defined a theoretical inflation target regime as an assignment from the government that commits a Central Bank to accomplish a task. The Central Bank is left to independently minimize the loss function which is delegated to it by the government. According to him, the government should not interfere in the execution of this task but the loss function may deviate from the social loss function. In addition, the bank is accountable for minimizing the loss function and as such, the bank is allowed to freely choose policy tools in the delivering of the task.

New Zealand pioneered the inflation targeting (IT) approach in 1989 and many other countries such as Australia, Brazil, Chile, Canada, United Kingdom, Sweden, the Czech Republic and South African followed suit. Roger (2009) mentioned that up to the 1990s, IT was seen as a monetary framework for advanced or industrial nations but commencing late 1990s, a rising number of developing and emerging market economies have adopted the framework and they now form the majority of the inflation targeters. Bestowing to Mishkin and Schmidt-Hebbel (2002), inflation targeting has become the obvious supplement of flexible exchange rate regimes among monetary regimes. They further stated that many countries irrespective of size, structural features, and development level choose inflation targeting with floating as ideal framework for implementing a more independent and effective monetary policy. Carare and Stone (2005) also agreed that an increasing number of countries use inflation targeting to define their monetary framework. They added that such countries adopt flexible exchange rate to maintain an independent monetary policy and limit their susceptibility to an exchange rate attack.

Roger (2009) mentioned that the spreading of IT has mostly been prompted by exchange rate crises. He revealed that the ERM crisis in 1992 served as a shoot to the adoption of IT in Europe whereas the transition economies of Central and Eastern Europe began introducing IT as part of their comprehensive economic reforms in the late 1990s. Furthermore, he indicated that full-fledged IT was adopted in Latin America in the late 1990s and early 2000s following the 1998 financial crisis while in East Asia, it began to be embraced in the early 2000s, as countries emerged from monetary targeting under Fund-supported programs succeeding the 1997 Asian financial crisis. Roger (2009) again indicated that on a practical front, the failure of indirect approaches, based on either monetary or exchange rate targeting, to yield acceptable results is the reason for the decision to pursue inflation targets directly.

It is useful to remark at this point that price stability is the main objective of the monetary policy under an IT regime. Masson, Savastano, and Sharma (1997)

mentioned that the principal basic element of this regime is the public announcement of an explicit quantitative target or range for a specified period of time. Second to this the said the Central Bank must decidedly and clearly price stability is the most critical agenda of its monetary policy. Beyond this, then the bank should have strong ability to forecast inflation and finally the operating procedure for the bank need to be forward looking. They clarified the last point as a mechanism in which the setting of policy instruments are dependent on the assessment of inflationary pressures and that the inflation forecasts serve as the main intermediate target.

Petursson (2000) also noted that with an inflation targeting policy, no formal intermediate target such as a fixed exchange rate or a specified growth in money supply is used. Nevertheless, he moved on to state that given the key role that the central bank inflation forecast plays in a monetary policy with inflation targeting, the forecast itself can be assumed as an intermediate target which supports the point made by Masson, Savastano, and Sharma (1997). Furthermore, Petursson (2000) clarified that if the forecast suggests that inflation will move outside the target band sometime in the future, the central bank is obliged to respond and in that case the central bank then decides on the mix of actions which it considers most favourable for achieving its objectives.

Carare et al (2002), Petursson (2000) and Roger (2009) all agreed with Masson, Savastano, and Sharma (1997) and pointed out that in addition to declaring price stability as the primary objective, accountability of the Central Bank is of outmost importance in attaining this objective. In a comparable statement, Mishkin (1998) directed that public announcement of medium-term numerical targets for inflation, information inclusive strategy, and increased transparency of the monetary policy strategy through communication with the public and the markets about the plans and objectives of monetary policymakers are added elements to an institutional commitment to price stability as the primary, long run goal of IT monetary policy.

Nonetheless, Carare et al (2009) opined that most inflation targeting emerging market countries need to take the exchange rate into account in the setting of the monetary policy even though the credibility of an IT framework requires that the policy should not aim at targeted levels of nominal or real exchange rate but because the exchange rate has an important impact on inflation for these economies due to their open nature. They added that, disruptive exchange rate volatility arising from temporary shocks or thin foreign exchange market is another reason for an emerging market country to smooth exchange rate movement.

6.4 Pros and Cons of Inflation Targeting

Discussion of the advantages and disadvantages of IT just like that of exchange rate targeting can help us in our quest to propose an alternative monetary policy regime. Overall, the advantages of IT are described as increased transparency, Central Bank independence and clarity with the policy objective.

Another benefit of IT is that a direct emphasis is put on managing expectations. Petursson (2000) said that IT countries appear to have positive experience because they have managed to reduce the inflation rate and inflation expectations, on top of what could probably have not been expected if no formal inflation target had been set. He went ahead to comment that, these countries have later on also positively contained inflation in the face of upswings in their economies and the impact of unanticipated price shocks has also apparently been dampened, he added.

Hammond, Kanbur and Prasd (2009) declared that there deal of evidence, both from individual country experiences and cross-country studies, that a central bank that pursues price stability can be most operational at delivering good monetary and macro outcomes. The basis for his argument is that low and stable inflation has large macroeconomic benefits that would stabilize GDP growth, increase investment, help the population make long-term plans with confidence, and by this means allow monetary policy to make its best possible contribution to long-run employment and output growth.

One more important advantage of IT is Central Bank independence which is highly advocated for globally. Mishkin (1998) mentioned that inflation targeting has the possibility to reduce political pressures on the central bank to pursue inflationary monetary policy and thereby lessen the probability of time-inconsistent policymaking. He said IT can help focus the political debate on what a central bank can do in the long-run (control inflation) rather than what it cannot do (raise economic growth and the number of jobs permanently) through expansionary monetary policy.

Inflation targeting also utilizes all available information and not just one variable. Mishkin (1998) emphasized this point by referencing that under IT, velocity shocks are mostly extraneous because the monetary policy strategy no longer relies on a stable money-inflation relationship but actually, it allows the monetary authorities to use all available information to determine the best settings for monetary policy.

Finally, it is worthwhile mentioning the pros of IT that are similar or different from other monetary policy regimes especially monetary and exchange rate targeting.

Mishkin (1998) documented that IT in contrast to exchange-rate targeting, but

like monetary targeting, allows monetary policy to focus on domestic considerations and to respond to shocks to the domestic economy. In the same paper, Mashkin (1998) put it that identical to exchange rate targeting, IT has the advantage of being readily understood by the public and in so doing, being highly transparent unlike with the monetary targets which are less likely to be easily understood by the public.

On the other hand, IT has its disadvantages. First and foremost, there is the possibility that the monetary authority will desert its other responsibilities. Also, the inconvenience for implementing IT may arise when price levels have huge variances. Hammond et.al (2009) noted that inflation targeting may not essentially be the best monetary policy framework for bringing inflation down from high levels because it depends on the capability to forecast the inflation, which is more difficult when inflation is high and volatile. They added that a central bank risks losing credibility by getting the forecast wrong and having large target misses.

In comparison to other monetary regimes, Petursson (2000) found out that the cost of a reduced inflation rate (in the form of increased unemployment) has not been lower among countries with inflation targets than those with other monetary regimes. By the same token, Mishkin (1998) renowned that even though IT does appear to be successful in moderating and controlling inflation, its effects on the real side of the economy are vague. He supported his claim by noting that inflation expectations do not adjust downward instantly after the adoption of inflation targeting and there seems to be little if any drop in the output loss linked with disinflation among countries adopting inflation targeting.

In concluding this sub section, it is useful to note experiences of developing nations that implement IT. But it seems there are concerns with IT even though a rising number of countries are adopting or considering it as monetary policy regime. Mishkin (1998) made a remark that a common apprehension raised about inflation targeting is that it will result to low and unstable growth in output and employment. But this he clarified and stated that even if inflation decline is connected with below-normal output during disinflationary phases in IT regimes , output and employment return to levels at least as high as they were previously once low inflation levels have been realized.

In the same publication, Mishkin (1998) elaborated that a conformist deduction is that inflation targeting is not harmful to the real economy once low inflation is reached. More strongly, he added that inflation targeting stimulates real economic growth in addition to controlling inflation since strong economic growth after disinflation was

achieved in many countries (New Zealand, an exceptional example) that have adopted inflation targeting.

The general experience with inflation targeting monetary framework sounds positive. Batini et al (2006) found out that the performance of non-industrial inflation targeting countries was good. They found out that countries adopting inflation targeting have, on average, better macroeconomic performance than those with other monetary policy frameworks in the past decade. Also, Merwe, E.J (2004) concluded that the introduction of inflation targeting has helped in the implementation of monetary policy in South Africa because it strengthened the Reserve Bank's mandate to focus on price stability. The consistent application of this framework he added, contributed to lowering inflation in the country.

6.5 Choice between Exchange Rate and Inflation Targeting

Monetary policy is the process by which the monetary authority in most cases the Central Bank of a country controls the money supply often targeting an interest rate for the purpose of achieving price stability, promoting sustainable economic growth and stability. The main goal of monetary policy can be price stability, exchange rate stability, low unemployment or both price stability and low unemployment.

Practically, the implementation of any form of monetary policy is based on the adjustment of the amount of base money in circulation. This is done via market transactions such as OMOs by the monetary authority to modify the supply of this currency which impacts other market variables like the exchange rate and the short term interest rate.

The peculiarity between different monetary policies is based primarily with the set of instruments and target variables that are used by the monetary authority to achieve their goals as illustrated below.

Table 6.1: Instruments and targets for various policies

Monetary Policy	Target Market Variable	Long Term Objective
Inflation Targeting	Price Index	Price stability
Monetary Aggregates	Growth in money supply	Price stability
Fixed Exchange Rate	Spot price of the currency	Currency stability

Both the Neoclassical and Keynesian economics admit that monetary policy affects monetary variables such as price levels and interest rates. Therefore the selection of a monetary policy for any individual country must be done with consideration of economic fundamentals and thoughtfulness.

Bearing in mind the discussions on exchange rate and inflation targeting highlighted above, there is no bad or good policy. However, clarity in the long term objective of the monetary authority can go in a far way in the implementation of an effective monetary policy. For instance, when the long term objective of a Central Bank is defined as price stability, it can pursue monetary or inflation targeting to achieve it. But when the long term objective is currency stability, then the bank can rely on exchange rate targeting as an effective policy. Nevertheless, exchange rate targeting countries can still attain low inflation. Mishkin (1998) reported that exchange rate targeting has also been an effective policy for reducing inflation quickly in emerging market countries. In another publication, Mishkin and Schmidt-Hebbel (2005) confirm that in general terms, inflation targeting is regarded as a good framework for keeping inflation low. Carare and Stone (2005) mentioned that monetary target is not practical owing to instability in money demand.

Narrowing our text on the two policy regimes under thought, it is vital to go through the experiences of both policies. Mishkin (1998) declared that currency board as a form of exchange rate regime is a specially strong and transparent commitment to an exchange rate target since it obliges that the currency issuing authority is always prepared and ready to exchange the domestic currency for a foreign one at the specified fixed rate whenever the public demands it. He added that a currency board normally has more that 100 percent foreign reserves backing the domestic currency in order to credibly meet these demands and hence there is no space for discretion by the monetary authority. In the same paper, Mishkin (1998) confirmed that inflation targeting has the potential to make it more likely that the monetary authority will escape falling into the time-inconsistency trap in which it tries to expand output and employment by following overly expansionary monetary policy. He clarified that this is possible under IT regime because an explicit numerical inflation target increases the accountability of the central bank.

Considering the repercussion of financial crisis on the two different regimes, Rose (2013) found out that the monetary regimes of many small economies have not changed in the aftermath of the recent global financial crisis. According to him, the business cycles, capital flows, and other occurrences for hard fixers have been comparable to those for inflation targeters both during and after the crisis. He

attributed the findings partly to the point that many small economies continue to use hard exchange rate fixes, which is soundly a tough regime, yet most of the new stability he said is due to countries that float with an inflation target.

6.5.1 Optimum Currency Area (OCA) theory

Optimum currency area in economics refers to a geographical region in which economic efficiency particularly trade could be maximized if the entire region shares a single currency. OCA theory was pioneered by Mundell (1961), an economist in a seminal article. The paper illustrated existing debates between flexible and fixed exchange rates with common currency as the extreme case of a fixed exchange rate. The theory is used mostly to reason whether or not a certain region is prepared to become a currency union. The introduction of EURO in 1999 serves as a very good and famous example of OCA. Since after its creation, several European countries joined it, thereby enhancing trade among these countries. For instance, Sideris (2009) assessed the readiness for euro adoption by six Central and Eastern European Countries based on the OCA criteria and his findings direct that the introduction of the euro did indeed promote integration of the six new member states and that they became associated with the euro zone.

Another example of OCA is the two CFA franc zone arrangements in Africa. There are two African economic and monetary unions, the Central African Economic and Monetary Community (CAEMC) and the West African Economic and Monetary Union (WAEMU) and each of these unions issues its own currency but has the same name, CFA franc. Each of the CFA francs is nominally convertible into the Euro but they are not convertible into each other directly. Narrowing our literature on West Africa where the Gambia belongs, there are currently fifteen member states that belong to the Economic Commission of West African States (ECOWAS) and eight of its French speaking countries are already in a monetary union (WAEMU). ECOWAS believes that the introduction of a common currency named ECO in the region will facilitate trade. The plan is that the ECO will first be rolled in the remaining ECOWAS member states that are not part of the WAEMU. These countries are; the Gambia, Cape Verde, Ghana, Guinea, Liberia, Nigeria and Sierra Leone and they form the West African Monetary Zone (WAMZ) but Cham (2010) clarified that Liberia and Cape Verde will be observers at the beginning. It is necessary to mention that the Gambia expressed interest with this proposal and highly looks towards its materialization.

At this point, let us relate the stylized fact of the Gambia in the context of the OCA theory and see if hard peg in the form of a common currency is ideal for the country.

The theory has been a standard tool for the investigation of currency union and it reflects many criteria but for this paper, I concentrate more on those that are trade related. Firstly, the OCA theory considers degree of openness for an economy. Referring to the Gambia, it a small open economy where internal trade activity is prominent. Kurihara (2011) mentioned that a nation whose domestic output has high contribution from national trade can benefit from OCA. If we relate this claim by Kurihara (2011) to the situation in the Gambia, then we can say that the country has satisfied this standard.

Secondly, we look at the trade relations between the Gambia and the proposed countries for the union because a similarity in business cycles or shocks is another consideration of the OCA theory. According to Kurihara (2011), closer trade relations may lead to a convergence of business cycles and related business cycles provide favourable conditions for policy integration likewise the formation of a common currency union. Bayoumi and Eichengreen (1993) and Krugman (1993) pointed out that as countries become more integrated, there is increased specialization which is predicted by traditional OCA theory.

Focusing on the proposed WAMZ zone, Cham (2010) indicated that the economies of the zone are diverse even though its main export is agricultural products. He singled out Nigeria and reported that it is the leading oil exporting nation within and is challenged with different terms unlike the rest. In the same paper, Cham (2010) noted that there exist differences in growth rates, fiscal systems and the seigniorage problems among the proposed countries for the union. Also, we can report that the Gambia does not have close trade link with any of the mentioned economies to join a union. From the 2010 trade summary[10] , none of the proposed countries for the union are major importing countries for the Gambia and only Guinea belong to the list of major exporting countries for the Gambia. Based on this, we can direct that close trade relation does not exist between the countries and therefore convergence in their business cycles cannot be established. Consequently, problems are excepted if such economies are put under a common currency because they differ in fundamental structures.

Thirdly, we inspect the OCA criterion of factor mobility. Kurihara (2011) explains that a high degree of labour mobility expedites adjustment to the hostile effects of irregular shocks and shrinks the pressure for exchange rate variations. For our case, Cham (2010) reported that even though there are similar labor market institutions in

[10] The latest publication by the Gambia Bureau of Statistics

the selected countries for the monetary union but labor is quite immobile in the zone. He proceeded to lament that such a scenario may result to shocks disturbing wages and prices at various magnitudes in each country, thus a difficulty would arise in trying to rectify the variances. The description is true for the Gambia. Hence it becomes costly to join a monetary union due to the absence or impossibility of common smoothing strategies to adjust the effects of shock on wages and prices.

Finally, we analyse the situation of exchange rate variability in the zone. Cham (2010) found empirical evidence of increased exchange rate variability across the zone between 2000 and 2005. This development is still persisting in the Gambia. As has been highlighted in the previous section, the movements in the exchange rate are not favourable and the country is challenged with the control of the long time and bothering fluctuations. Such a scenario is not ideal for a country preparing to join a monetary union.

6.5.2 Pre-conditions for IT,

The belief that IT is not suitable for non- industrialized economies is receiving lots of challenges in more recent literatures. There are countless evidences that IT has performed well in emerging market and developing economies as well and this counters the originally perceived notion. However, there are proposed initial conditions that a country is expected to satisfy before opting for an IT regime. Since IT has performed well in other developing nations, it is right we consider prerequisites for the regime with the situation in the Gambia in this subsection to see if it can be applicable the country too.

Masson, Savastano and Sharma (1997) and Carare et al (2002) discussed some initial conditions that an emerging market country can institute before implementing an IT monetary framework. We look at the conditions one by one and relate each to the actual prevailing conditions in the Gambia. According to these authors, the number one prerequisite is the mandate to pursue an inflation objective and accountability of the monetary authority in achieving this objective. It means the Central Bank should have a sole target. As clearly stated in the CBG Act of 2005 Part II, section 5.1 (a), price stability is a primary objective of the bank. Therefore, relying on this statement, we can conclude that there is the mandate to pursue price stability and it is given priority in practise. For the accountability aspect, it can be connected with transparency since the increase in the transparency leads to increase in accountability. The Central Bank should provide some explanation to the public when the monetary policies are unsuccessful in achieving the targets. CBG has a monetary policy committee in place that meets regularly to take decisions on

the implementation of the policy. The minutes of these meetings are disseminated via local new papers and on the bank's web page. It is also included in the annual reports of the bank. With such a level of transparency, accountability in attaining the policy object may be claimed to be in existent.

The second condition by Carare et al (2002) relates to non-dominance of the target by other objectives. This includes among others, Central Bank independence, lack of both fiscal dominance and commitment to another nominal anchor as emphasized also by Masson, Savastano and Sharma (1997). The situation in mixed in the country for this pre condition. The 2013 IMF article IV consultation staff report detailed that inflation has fluctuated year-on-year since 2007 because of the usual monetary restraint implemented by CBG. Notwithstanding, the report highlighted that there have been periods of monetary expansion driven by fiscal dominance manifested by the end of 2012 when inflation has been gradually rising year-on-year. Adding to these, the country underwent some policy challenges towards 2011. Among them was the extra budgetary spending demands that emerged in 2011, remarkably an increase in fuel subsidies to mitigate the impact of rising international oil prices and additional pressures from election related spending and the wage bill as reported by the CBG 2011annual report. Although strategies were implemented to bring the policies back to order, developments towards fiscal consolidation were interrupted in 2012. The fiscal deficit in 2012 turned out to exceed the budgeted and CBG financed the deficit (IMF article IV report, 2013).

On the other hand, there are some attributes of independent central bank such as the prohibition of credit extension to the public and commitment to the achievement of price stability as the primary objective. These are both important steps in the process of independence because the monetization of public debts and credits given to the public sector can contribute to the reasons why a central bank may miss its target.

The third set of conditions pointed out by Carare et al (2002) revolves around stable and developed financial system. Overall, the economy has a small financial sector and it is overshadowed by the banking sector which continues to be stable and attractive. This argument is supported by Sriram (2009) who reported that the growth in the financial sector has been sharp in the Gambia since 2000. According to him, such development is mainly attributed to strong capital inflows, financial innovation,

embargo on informal foreign exchange markets and expansion in both new banks and branches within the banking sector.

It is useful to point out once more that there is no stock market Gambia but there is a small developing foreign exchange market with commercial banks and foreign exchange bureaus serving as the key players. This fact is reinforced by Sriram (2009) who narrated that although private debt securities are not common, the country has a government debt securities market in which treasury bills are traded. Moreover, CBG performs the monetary policy via the financial system (specifically through OMOs). The agreed signal rates together with the reserve ratio requirements function through the financial system to impact the demand for money by the economic agents.

The fourth set of prerequisite from Carare et al (2002) is appropriate instruments to implement monetary policy in support of the inflation target. We deal with this initial condition by sub precondition for better clarity. Carare et al (2002) claims that in an inflation targeting regime, monetary authorities should be able to use the policy instruments in influencing inflation and to understand the relationship between inflation and the policy position to a reasonable degree. Masson, Savastano and Sharma (1997) also explained that there should be a quantitative framework that links policy instruments to inflation. Based on the Johansen cointegration tests for our model above, we conclude that there is cointegration among these variables. This serve as an evidence to say that there exists stable and long-term relationship among those variables. Furthermore, the empirical results suggested by VAR analysis, indicate a predictable link between inflation and exchange rate. This may be cited as an argument to fulfil this initial condition since monetary policy instruments such as exchange rates, money supply and interest rates must contain predictable information about the future path of inflation for an effective IT.

Also, Carare et al (2002) asserted that the monetary authority should clarify that, FOREX market interventions and policy interest rate adjustments to influence the exchange rate are only meant for smoothing purposes. That is, pursuing of price stability should dominate the exchange rate objective. Masson, Savastano and Sharma (1997) clarified that inflation should be the sole target and other nominal variables such as nominal exchange rate or wages should not be committed to as a policy target. Undoubtedly, the bank performs its monetary policy with an environment where exchange rate objective is subordinate to price stability. The 2013 IMF article IV report, declared that the Gambia is a signatory to the obligations of Article VIII, Sections 2(a), 3 and 4 which directs to an exchange system without

limitations on the making of payments and transfers for current international transactions, apart from restrictions retained exclusively for the protection of national or international security, which have been put to the notice of IMF. Although, the country has adhered to this status for long, but of recent, there were deviations from the agreement. The same report confirmed that numerous presidential directives that forced over valued exchange rates were witnessed by the economy between October 2012 and August 2013.

On a final point, Carare et al (2002) highlighted the need for proper coordination for Fiscal policy and public debt management activities in the up keep of the inflation target. Relating to this claim, we reflect on the performance of the bank when the country faced some policy challenges not long ago. The CBG annual report underlined that there were problems in the economy together with rise in food and fuel prices around 2011 that made it difficult to achieve the predicted 5.0 percent inflation target in the first half of 2011. As a response, according to same report, Fiscal tightening was executed that resulted to an immediate decline in financing from 3.8 percent of GDP in 2010 compared to 2.3 percent in 2011. Also, it was stated that monetary policy was tightened in 2011 to restraint in inflationary pressures. The bank claimed that with this reaction it managed to reduce the interest rate.

Although not ideal, the 2013IMF article IV report reported that CBG financed the deficit when the fiscal deficit in 2012 which the bank suggests have apparently contributed to a control in inflation and exchange rate depreciation. The same report informed that the domestic debt increased to 39 percent of GDP by end 2013 and a huge portion of the government resource was consumed by interest on debt mainly spent on domestic debt. It continued to underline that government's expenditure on this interest stood at 22.5 percent of government revenues in 2012 and nearly 18.5 percent was paid on domestic debt.

With this, it seems difficult to assess the degree of compliance with the basic initial conditions of an inflation targeting regime and this is agreed to by Masson, Savastano and Sharma (1997). In the majority of developing countries, including the Gambia, some of the prerequisites to a great extent are often not present. But many countries went ahead and have successful results from the implementation of IT. A brief summary of my assessment on the Gambia opinions that CBG has met some of the conditions but it is far from meeting others. But Masson, Savastano and Sharma (1997) put greater emphasis on the pre-conditions that deal with independence and inflation as sole target condition. They claim that if these two prerequisites are

satisfied by any country, then it can consider implementing IT. Furthermore, it is fair to mention that Carare et al (2002) clarified that the prerequisites suggested are not predestined to be all met before a country can opt for an IT regime. They cited that IT has performed well largely in the face of hitches in fulfilling some of these pre conditions by emerging market countries.

Adding to this, Batini, Kuttner and Laxton (2005) have argued that these conditions should not serve as a rule of the thumb to be met prior to deciding on an inflation targeting monetary policy regime. They went ahead to claim that the initial conditions may serve as a guide for better and smooth performance citing an IMF Research Department survey of central banks which suggests that improvements in these conditions have generally followed or go along with rather than preceded the adoption of inflation targeting. In fact, one may argue that some form of inflation targeting is already being applied by the CBG because considerable emphasis is placed on the attainment of price stability but the time period over which this would be achieved is not specified. Batini, Kuttner and Laxton (2005) recommend that an applicable way to assess the preparedness of non-industrial countries for effective IT could be to apply traditional technical conditions as “co-requisites” rather than as prerequisites for adopting inflation targeting. They singled out a strong commitment to support the policy framework and nurture the development of the conditions for its success as very vital among those technical conditions.

Turning back to the exchange rate situation in the country, my argument is that its current fluctuation pattern (mostly depreciating) should not justify the choice for a monetary union. Fluctuations in exchange rates are essential in the determination of monetary policy because they could have a foremost influence on inflation. In line with this argument, Merwe (2004) stated that highly indebted developing countries are predominantly vulnerable to exchange rate movements if their debts are denominated mainly in foreign currencies. This is similar to the case of the Gambia, as has been highlighted in the 2013 IMF Article IV staff report. But Merwe (2004) made it clear that an extensive depreciation of a domestic currency under such circumstances could simply result to a financial crisis and he went ahead to state that with such effects of exchange rate movements on the domestic economy, the Central Bank may be tempted to focus too closely on exchange rate stability. Conferring to Mishkin (2000) who pointed out that when the risk arises that the exchange rate instead of the inflation target may become the nominal anchor of monetary policy, monetary policy tightening may be practised sometimes even when inflation expectations and forecasts do not indicate that inflationary pressures are increasing, or vice versa. He mentioned that high anxiety about exchange rate

stability can prompt a wrong policy response and pronounced that monetary policy performance could get worse when exchange rate is being targeted under certain situations as well a recession or an overheating of the economy may be final, he concludes. Surely, a policy change could be justified for CBG with its present battle with exchange rate stability before it will shift more attention on exchange rate stability and abound price stability which can lead to more problems.

CHAPTER 7: CONCLUSION and POLICY IMPLICATIONS

7.1 Conclusion

The first part of this study aims to examine sources of exchange rate fluctuations of the Gambia for the period from 1998:Q1 to 2012:Q4 using a five variable VAR model with the application of cointegration test, vector error correction model (VECM), impulse response analysis and variance decomposition. All variables were considered as endogenous in the estimation process. But to check for the robustness of the results, the same variables were regressed over the world price of rice, a commodity that is the main imported good in the Gambia. The results from the two estimations were not much different. The outcomes from cointegration test suggest that key macroeconomic variables have a long run equilibrium relationship. Subsequently, the study continued to perform VECM and the results reveal that error correction mechanism is achieved in most of the key variables such as exchange rate, GDP, CPI and money supply which means, there exists the convergence process. The results provide economically reasonable and mostly statistically significant coefficients.

The presentations of impulse response analysis and variance decomposition conclude that the selected key macroeconomic variables are the main sources of exchange rate fluctuations in the Gambia. Both CPI and money supply has a positive relationship with exchange and this supports our subsequent hypotheses. In addition, the largest share of exchange rate variability comes from its own shocks. GDP and money supply also seem to enforce exchange rate fluctuations. It implies that certain sources of exchange rate fluctuations come from macroeconomic variables.

The second part of this study has attempted to explain mainly the exchange rate and inflation targeting monetary regimes and their applicability to the Gambian economy. My conclusion of the choice of monetary regime relies on a comprehensive classification of de facto behaviour, gathered by the IMF and available literatures. The criteria of the OCA theory and prerequisites of inflation targeting were considered in an effort to choose between these two and identify a better policy regime for the country. That is to join the proposed WAMZ monetary union or adopt inflation targeting. We relied on four OCA criteria which are mostly trade related: degree of openness for an economy, trade relations between the countries, factor mobility and finally exchange rate variability. To be unbiased, four prerequisites of an inflation targeting framework have been identified: having a sole target, a degree of

independence of the central bank- which is concerned with freedom from fiscal dominance, stable and strong financial system and finally the existence of a predictable and stable relationship between monetary policy instruments and inflation outcomes.

With the analysis of a choice to join a monetary union, we found out that the country is a small open economy where internal trade activities contribute noticeably to the domestic product. But the Gambia does not have close trade link with any of the mentioned WAMZ economies to join a union. From the 2010 trade summary, we found out that none of the proposed countries for the union are major importing countries for the Gambia whereas only Guinea belongs to the list of major exporting countries for the Gambia. We complete that the second criterion is not met, and therefore no convergence in their business cycle can be established. Therefore, problems are excepted if these economies are put under a common currency because they differ in fundamental structures. Furthermore, the findings from the factor mobility criterion were solely based on Cham (2010). He claimed that there are similar labor market institutions in the selected countries for the monetary union, but labor is not mobile in the zone. So we conclude that factor mobility is absent in the region. Finally, exchange rate variability in the zone is assessed based on the findings by Cham (2010). He found evidence of increased exchange rate variability across the zone between 2000 and 2005. In fact, the situation continues to persist in the Gambia up to date as has been highlighted in chapter 3 of this paper. The state is not ideal for a country preparing to join a monetary union.

The analysis of the satisfactions for the prerequisite conditions of IT shows that the issue of having a sole target of price stability is met. However, our findings pointed out that central bank independence in the Gambia is challenged. Although CBG is instrument independent, we found out that it is not fully operational independent. The recent exchange rate over-valuation directives can be cited to support this argument. Also, there are evidences of some problems about the fiscal dominance. The Gambia like many developing countries do not satisfy this requirement due to the presence of seigniorage revenues that serves as an important source for public financing. We found out that CBG had to finance budget deficit as a lender of last resort. Therefore, the initial condition of independence is partly not satisfied. The third precondition of strong financial stability and development is assessed to be fair. We realized that even though the country lack a stock market which gives strength to a financial market, it conducts its monetary policy effectively through the financial system which is stable and attractive. For the final pre-condition, we reflect on the empirical work part of this study which provides evidence of relations between the

instruments of monetary policy such as nominal exchange rates and inflation rate as well established a relationship between exchange rate and other policy variables such as the short term interest rate in the Gambia.

Furthermore, the main contribution of this paper is the evidence it provide of exchange rate pass through into the economy. This finding is useful because a Bank needs to know about the transmission mechanisms of its monetary policy. As explained by Svensson (1997) the direct exchange rate channel is somehow distinctive among the transmission channels because the lag between exchange rate movement and effect on the CPI accounts shorter than for the other channels. He justified this speciality by recapping that import prices normally react with a relatively short lag and as such in an open economy, there is hypothetically an option for a central bank to target CPI inflation more narrowly and strictly, at a shorter horizon, by relying more on the direct exchange rate channel. This finding may be cited as an argument for preparedness to implement inflation targeting lite in the Gambia.

To sum up, based on the methodology applied in this paper, the Gambia has satisfied only one criteria for a hard peg in the form of a common currency. With the initial conditions for and IT regime, it has gently fulfilled two out of the four although recent papers clarified that these prerequisites does not all have to satisfied before deciding to implement IT.

This balance might support our conclusion but we snip into the experience of South Africa as it was in a similar situation in the past and can be cited. According to SA (2004), South Africa witnessed serious fluctuations in its exchange rate in the past. Merwe (2004) reported that the country attempted to maintain a fixed or semi-fixed exchange rate system, as a response by pegging the rand to the dollar, sterling and a basket of currencies but it ended without any meaningful success. He went ahead to support this judgement by mentioning that in the 1980s and 1990s, significant swings were in fact recorded in the exchange rate of the rand, despite the chosen exchange rate system. But with the implementation of IT, the exchange rate situation has improved, he concludes. This could serve as a lesson for the Gambia.

Consequently, despite the fact that the Gambia is far from satisfying some initial conditions of inflation targeting monetary policy regime, it is a better choice to make. My conclusion is similar to the very few papers that focus on monetary policy in the Gambia. For instance, Sriram (2009) recommend an inflation targeting lite as a possible option for the Gambia in the conduct of its monetary policy.

7.2 Policy Implications and Recommendations

Since variability in the exchange rate is determined by economic fundamentals, policy makers should be able to manage its fluctuations by means of controlling these factors especially CPI and money supply being the most influential on exchange rate fluctuations. With this, policy maker decisions are enhanced in many countries to adopt inflation targeting as a monetary policy which has helped generally to attain the primary objective of price stability and furthermore a decline in exchange rate volatility.

The problems related with Central Bank independence have to be resolved for the Bank to freely and independently function by applying its own discretion and conduct monetary policy in a more efficient way. Principally, the situation of external interference with the monetary policy implementation particularly with the movement of the exchange rate should be totally discouraged because it does not help at all especially with inflation targeting. This does not infer that inflation targeting Central Banks should not pay attention to exchange rate developments. Of course, the exchange rate is an important transmission mechanism of monetary policy because its changes affect inflation, aggregate demand and economic growth to name a few. Therefore, the monetary authority needs to closely monitor the exchange rate developments and make the right decision independently. This goes a long way in avoiding disruptions to the exchange rate market and finally a successful implementation outcome.

Finally, the monetary authority should embrace the issue of transparency in the form of sharing information with the public and strengthen it because inflation targeting policy calls for a better co-ordination compared with other monetary policy. This can be realized through the structured decision-making process of its framework.

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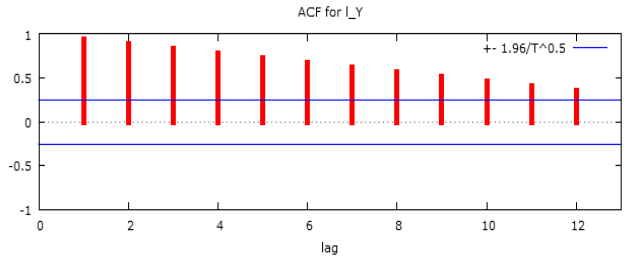
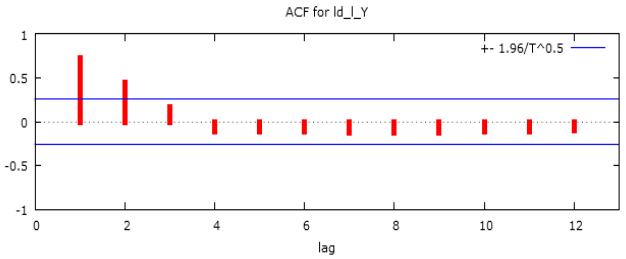
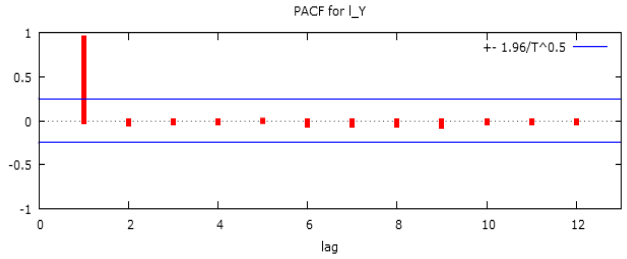
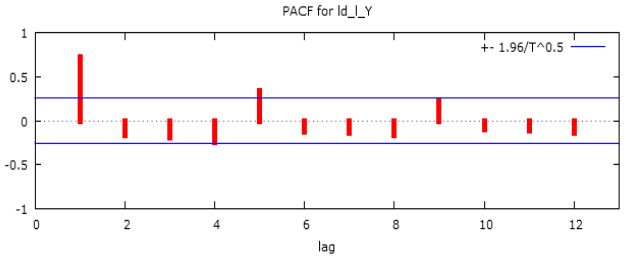
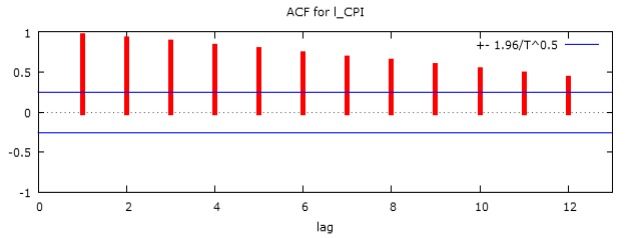
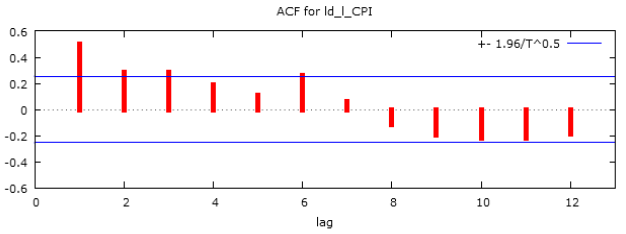
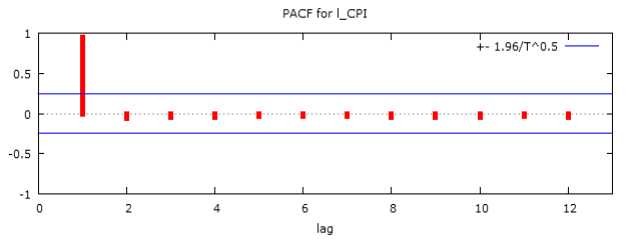
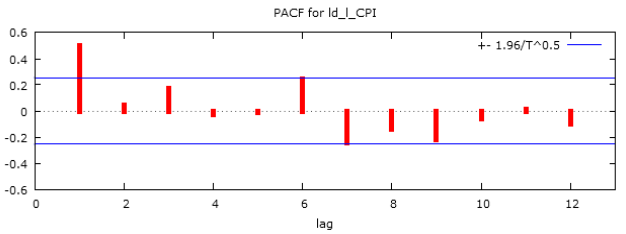
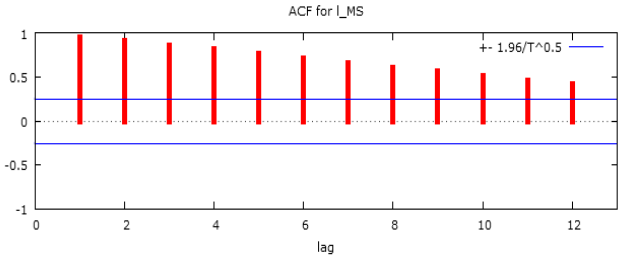
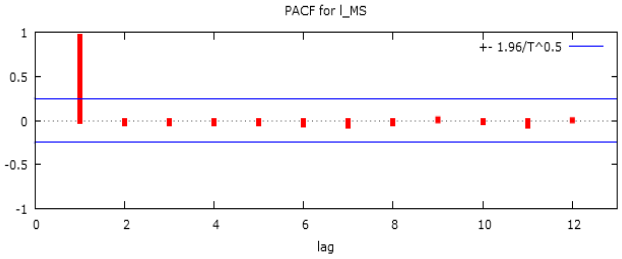
Appendix I: Correlogram output of the variables

Level	First Difference
	
	
	
	


ACF for l_MS
+- 1.96/T^0.5
lag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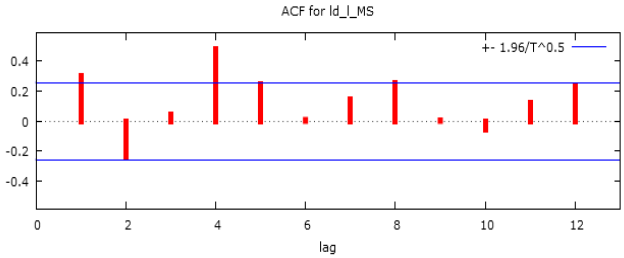
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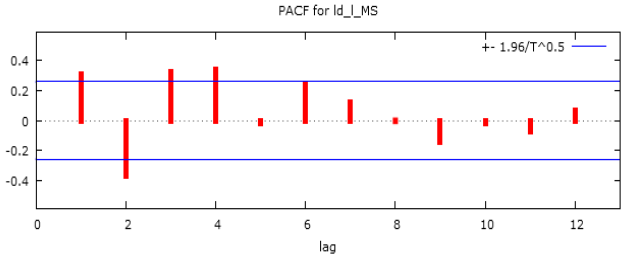
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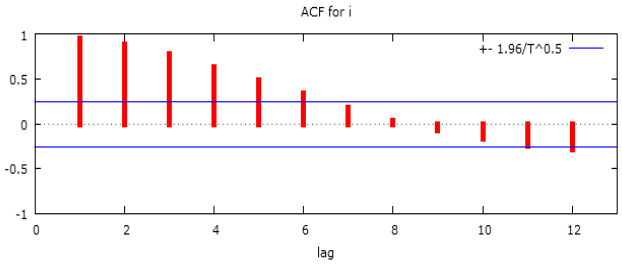
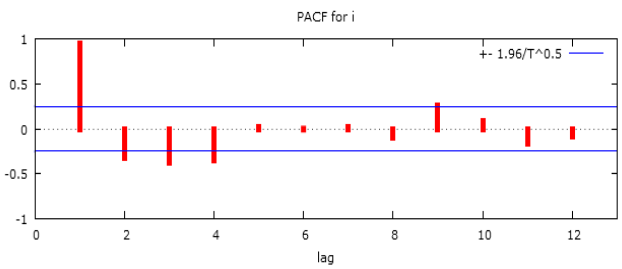
+- 1.96/T^0.5
lag


ACF for i
+- 1.96/T^0.5
lag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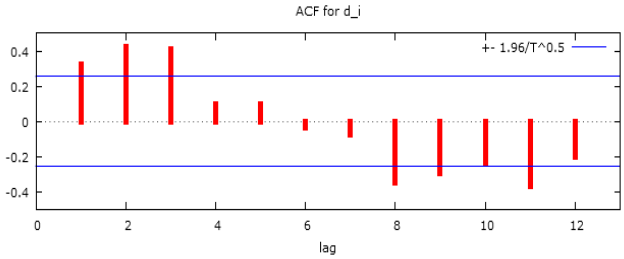
ACF for d_i
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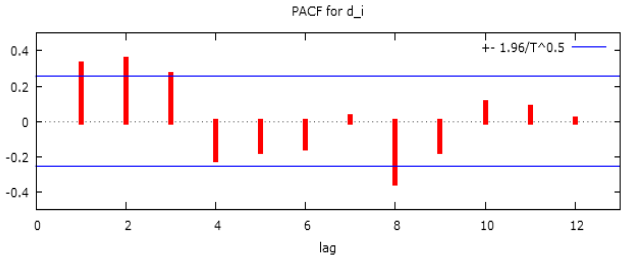
lag


PACF for d_i
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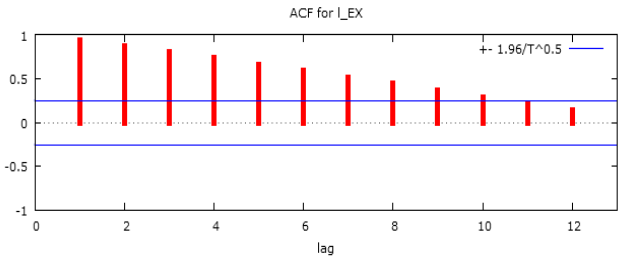
lag


ACF for l_EX
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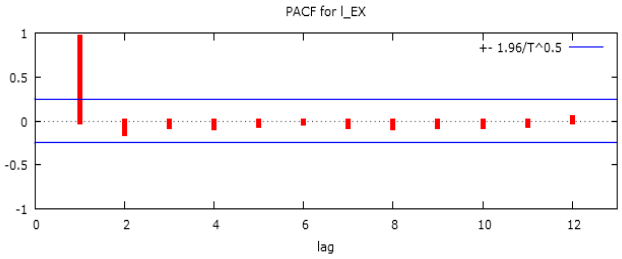
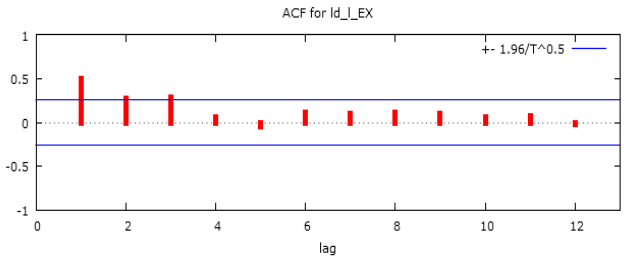
lag


PACF for l_EX
+- 1.96/T^0.5
lag


ACF for ld_l_EX
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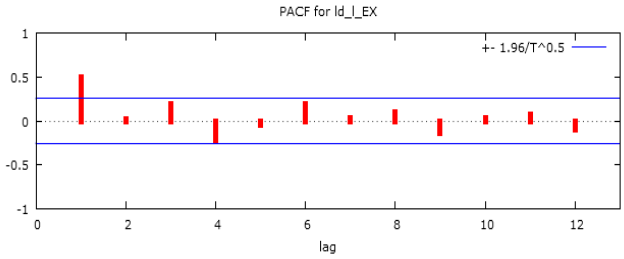
PACF for ld_l_EX
+- 1.96/T^0.5
lag

Appendix II: Decomposition of Variance for Exchange Rate

Decomposition of variance for l_EX

period	std. error	l_EX	l_Y	l_CPI	l_MS	i
1	0.0399704	100.0000	0.0000	0.0000	0.0000	0.0000
2	0.0663392	99.3836	0.0130	0.3366	0.1722	0.0947
3	0.0867392	98.2170	0.0187	0.3385	1.3687	0.0571
4	0.102751	95.9952	0.2361	0.3033	3.2720	0.1934
5	0.115466	93.4685	1.0031	0.3014	4.8603	0.3667
6	0.125928	90.8036	2.6004	0.3000	5.8609	0.4350
7	0.135106	87.7763	5.0293	0.2715	6.4910	0.4318
8	0.143536	84.4331	7.9756	0.2424	6.9449	0.4039
9	0.151301	81.0886	11.0102	0.2500	7.2822	0.3690
10	0.158268	78.0532	13.7971	0.3153	7.4970	0.3374
11	0.164307	75.4708	16.1599	0.4546	7.5864	0.3283
12	0.169393	73.3280	18.0501	0.6880	7.5655	0.3684
13	0.173609	71.5263	19.4951	1.0361	7.4570	0.4855
14	0.177117	69.9384	20.5557	1.5142	7.2858	0.7058
15	0.180127	68.4417	21.2977	2.1296	7.0807	1.0503
16	0.182853	66.9379	21.7786	2.8806	6.8726	1.5303
17	0.185479	65.3650	22.0459	3.7551	6.6901	2.1439
18	0.188139	63.6987	22.1398	4.7318	6.5542	2.8755
19	0.190911	61.9461	22.0959	5.7826	6.4759	3.6996
20	0.193826	60.1335	21.9465	6.8768	6.4567	4.5865

Appendix III: Decomposition of Variance for Exchange Rate including Price of Rice

Decomposition of variance for l_EX: Rice as exogenous

period	std. error	l_EX	l_Y	l_CPI	l_MS	i
1	0.0407914	100.0000	0.0000	0.0000	0.0000	0.0000
2	0.0692813	99.5983	0.0002	0.1415	0.2586	0.0015
3	0.0919928	97.5155	0.0564	0.1607	1.9795	0.2879
4	0.111286	93.4719	0.4343	0.1855	4.6438	1.2645
5	0.128335	88.8861	1.4283	0.2992	6.9694	2.4170
6	0.144025	84.3582	3.1085	0.5105	8.6663	3.3564
7	0.159235	79.9099	5.2225	0.7522	10.0140	4.1013
8	0.174436	75.6494	7.3504	0.9736	11.2569	4.7698
9	0.1896	71.8036	9.1502	1.1733	12.4595	5.4134
10	0.20441	68.5591	10.4724	1.3663	13.5845	6.0177
11	0.21853	65.9788	11.3228	1.5582	14.5866	6.5536
12	0.231747	64.0219	11.7832	1.7435	15.4457	7.0057
13	0.243991	62.5974	11.9563	1.9133	16.1599	7.3731
14	0.255289	61.6024	11.9379	2.0613	16.7362	7.6622
15	0.265728	60.9393	11.8064	2.1850	17.1871	7.8822
16	0.275427	60.5213	11.6196	2.2845	17.5301	8.0445
17	0.284513	60.2747	11.4173	2.3618	17.7852	8.1610
18	0.293114	60.1388	11.2246	2.4202	17.9730	8.2434
19	0.301344	60.0659	11.0569	2.4631	18.1120	8.3021
20	0.309303	60.0198	10.9223	2.4945	18.2178	8.3456